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SEVENTH CONTRIBUTION TO THE HERPETOLOGY OF
TROPICAL AMERICA.

By EDWARD D. COPE.

[Read before the American Philosophical Society, July 16, 1839.]

HYDROMEDUSA TECTIFERA, *Cope, sp. nov.*

Char. The anterior portion of the carapace depressed and prolonged ; the first vertebral scutum nearly twice as long as wide ; the nuchal scutum narrow transverse, twice as wide as the first vertebral ; four times as wide as long. Light brown, with slightly radiating or transverse darker brown spots on the costal plates. Below bright yellow.

Description. Carapace more elevated at the anterior vertebral bone than above the pelvis, then descending steeply, and prolonged roof-like to the nuchal margin. Posteriorly rather abruptly decurved to opposite the lowest plane of the sternum, and considerably below the strongly recurved points of the posterior lobe of the same. Two posterior vertebrals and each posterior costal with a projection at the posterior part. Margin a little elevated and turned out above the hinder limbs. The sides descend steeply, and the superior plane is broad outside of the scapulæ. Lateral marginals not prominent, being a ridge directed rather upwards, which is bounded above by a strong groove. Fine median marginals not united to disc throughout, but by costal processes. The first three marginal bones very much wider than long, the second nearly twice as wide. The nuchal marginal very large, as long as wide. Three marginal bones of the bridge with an undulate ridge along their upper margin, the third with the ridge running diagonally across it, descending behind.

Two last pairs of costal bones united on the median line. Last vertebral scutum of an urceolate form, much narrower at its point of contact with the penultimate. The latter the narrowest of the series. Penultimate marginal scutum extending nearly to the middle of the last vertebral. Second marginal scutum much longer than wide, the first, twice as long as wide. First costal longer than wide.

Sternum without fontanelle or intersternal elements, the anterior lobe both longer and wider than the posterior. The gular scuta small, the humeral and femoral each considerably wider than the pectoral. No axillary or inguinal plates, bridge short ; claws strong. Posterior lobes with a deep rounded emargination.

Measurements.

	In.	Lin.
Length carapace (over arch).....	11	4
Depth.....	3	1
Length sternum.....	8	4
Total width below.....	6	2
Length bridge.....	1	8
“ femur (straight).....	2	4
“ tibia.....	2	5
“ foot.....		23

Upper surface of limbs dark brown.

Habitat. This turtle occurs in some of the tributaries of the Parana or Uruguay rivers, either in the Argentine Confederation or the Banda Oriental, but in which, I do not know. My information is derived from W. W. Morgan, M. D., of Philadelphia, who resided many years in Monte Video, where he obtained the specimen from a collector.

This species differs from those already known, in the greater extension forwards and laterally of the anterior margin of the carapace. In consequence the forms of the vertebral, nuchal, and marginal plates are exaggerated in form, the first in length, the last two in width.

CHELOPUS RUBIDUS, Cope.

If this genus be regarded as co-extensive with the *Geoclemmys* of Dr. Gray, it embraces with the present addition, fourteen species.

Carapace oval, moderately elevated and with obtuse median keel; margin entire not recurved. Vertebral plates broader than long, with concave posterior sutures, except the anterior, in which the length is somewhat in excess. Its lateral margins are parallel and the anterior angle is produced, curtailing the small nuchal. Scuta concentrically grooved, visible, though obsolete in the old individual. Plastron rather plane, deeply emarginate behind; very openly in front. Inguinal and axillary scales very small. Areolæ of the scuta a little above and behind their centres.

Claws short, toes much united on all the limbs. Soles and palms with large scales. Forearm with six cross-rows of large scales in front, and two longitudinal rows on the outer side. A cross series of three across the carpus behind. Posterior foot club-shaped. Testudo-like, the heel with three cross rows of shields of 1, 3, 2 respectively, the posterior of the last two very large, double the next smallest. Rest of the hind limb small scaled.

Head broad plane above, muzzle and loreal region vertical. Beak obtusely hooked, not emarginate; alveolar faces without grooves or ridges.

Ground color of body yellow, the limbs and throat shaded and spotted with red, which is margined with black. The neck above and laterally is marked with numerous black rings and lines; below with the gular region it is closely black dotted. Tail very short, even in the males, yellow, with fine black longitudinal lines above. Limbs with black and pink dots. A chevron shaped red band extends from the orbits round the canthus nostralis and muzzle, and another wider and with narrow black margin between the orbits, with the apex forwards. Two similar bands extend from the orbits posteriorly to the obscure tympanum, and two are concentrically arranged on the occiput, the apex of the anterior being separated as a large red spot. In the male the colors are deeper and brighter. Carapace yellowish brown, each costal scutum with a horizontally oval black-edged yellow spot in its area, surrounded by yellow annuli. The young shows that there are two such concentric annuli. Marginals with alternating longitudinal yellow and black lines above, brown below. In the young, the vertebrae have a marginal yellow annulus, and median oval ring with yellow and black variations.

Below, deep brown, the plastron broadly yellow all round. In the young the yellow extends over the whole plastron; in the very old the brown is very narrow medially.

Measurements, (No. 265.)

Greatest length plastron.....	(m. .1525
Width medially (Total).....	" .1123
Greatest length carapace.....	" .16
Greatest elevation carapace.....	" .064
Hind limb from knee.....	" .0538
Fore " elbow.....	" .041
Head and neck above.....	" .07
Width head (Temporal).....	" .024
From orbit to end muzzle.....	" .0082

Habitat. Tuchtan Tehuantepec, Mexico, discovered by Prof. Francis Sumichrast. Four specimens, Nos. 264-5-6-7.

This handsome land tortoise appears to approach sufficiently near the *C. callicephalus*, Gray (Proc. Zool. Soc., London, 1863, 254), of unknown habitat, to render a comparison proper. That species according to Gray, has a posteriorly truncate plastron, and a notched beak. The vertebral scuta are as long as broad, the second and third longer. The chin, throat, and upper parts of the neck are spotless. We owe this species to our active correspondent, F. Sumichrast, who since the days of Natterer, has not been equalled in the thoroughness and extent of his zoological researches in Tropical America.

CONIOPHANES PICEIVITTIS, Cope.

Scales in twenty-five longitudinal series, vertex and muzzle in one plane; upper part of rostral plate prominent, not produced between the internasals. Latter less than half prefrontals. Prefrontals longer than wide, decurved to the subquadrate loreal. Postnasal higher than prenasal. Preoculars one or two, postoculars two, superior larger. Superciliaries narrow. Frontal rather wide, with long posterior angle, and parallel lateral outlines which are little shorter than the anterior. Occipitals elongate, scarcely emarginate behind. Superior labials eight, fourth and fifth entering orbit. Sixth higher than long; seventh largest. Temporals 1-2. Postgeneials shorter than pregeneials. Inferior labials ten. Gastrosteges 158 two anals; urosteges, 90. Total length, .542 m.; of tail, .063 m.; from muzzle to canthus oris, .014 m.; interorbital width, .0048 m.

The ground color above and below is white, which is immaculate below, except on the throat and chin, where it is black dusted. Above three broad black bands extend from the end of the muzzle to the end of the tail. The inferior commences on the middle of the third row, and occupies three and two half rows of scales; a row and one-half intervenes between this and a median dorsal band which covers six and one or two half rows. The ground color on the head is an irregular line from the muzzle along each canthus and beyond orbit, and the upper labial plates; these are thickly dusted with black, the anterior spotted on the edge.

From Chihuitan, Tehuantepec, Western Mexico. F. Sumichrast, Coll. in Mus. Smithsonian, No. 248.

SYMPHIMUS LEUCOSTOMUS, Cope, *sp. et gen. nov.*

Char. gen. Dentition isodont; cephalic plates normal except that the internasals are confluent with the nasal, and the latter with each other and with the loreal. Preorbitals one. Rostral shield not prominent; scales smooth, equal, uniporous; anal bifid. General form elongate.

This genus differs from *Chilomeniscus*, to which its technical characters are similar, about as much as any colubrine serpent does from a burrowing calamarian. Its form is nearly that of *Cyclophis*, and it should perhaps be placed nearest to it in the system. Steindachner's *Bergenia mexicana** should, it appears to me, be referred to *Chilomeniscus* Cope, of which it is the fourth species.

Char. specif. The head narrow, not very distinct, the muzzle acuminate, but obtuse at the extremity. The scales in fifteen longitudinal series. The form is cylindric and elongate. The tail of medium length as in *Cyclophis*. Rostral plate high as wide, scarcely visible from above, not prominent. Side shield of the muzzle pierced by the nostril and extending to the preocular; latter long as high, not reaching the frontal. Postoculars one on one side, two on the other. Superior labials seven, third and fourth bounding orbit, all longer than high except the fifth; temporals 1-2 large, the anterior bounding the fifth and sixth labials. The median sutures of the rostronasal and prefrontal plates of equal length. Frontal longer than wide, with concave sides; superciliaries wide, occipitals elongate, common suture nearly as long as prefrontals and frontals together, truncate behind. Inferior labials eight, fifth largest—narrow; pregeneials a little longer than postgeneials. The eye is rather small. Urosteges, 111, gastrosteges.

Color olive gray above, a dorsal band of light brown extending over three rows of scales to the origin of the tail; the skin of its median region being yellow. Throat, chin and superior labials light yellow, a black line above the superior labials from the second posteriorly. The brown of the upper regions descends to the lower row of scales at about the twelfth transverse row; two or three lower rows are pale edged. Belly dirty white. The dorsal band is posteriorly ill defined, and extends a little beyond the vent; tail brown.

	In.	Lin.
Total length, No. 240.....	31	5.5
Length tail.....	10	9
Length rictus, No. 227.....		6.8
Interorbital width.....		2.8
Width muzzle.....		1.8
Width orbit.....		1.4
Length tail.....	7	0

No. 240. From Chihuitan, from the same.

No. 227. From the collections of the Smithsonian Institution from the province of Oaxaca, Mexico, made by Francis Sumichrast.

* Reised. Oester. Freg. Novara Reptilia, 92 fig.

LEPTODIRA MYSTACINA, Cope.

Scales in nineteen longitudinal series. Body very slightly compressed, head distinct, an elongate oval. Superior labials seven, the second in contact with the upper and lower preoculars, third and fourth with orbit, and fifth with occipital excluding the temporal. Fourth, fifth, and sixth higher than long; temporals 1-1-2. Oculars 2-2, inferior small in both sets. Internasals long as wide, prefrontals longer than wide. Frontal longer than wide, with parallel sides, considerably in contact with superior ocular. Occipitals oval, scarcely emarginate behind. Postgenaeals longer than than pregenaeals. Gastrosteges 187, anal 1-1, urosteges 70.

The ground color is a dirty white, and is uniform below. Above it, marked by very broad cross-bands, which extend to the gastrosteges and are twice as wide as the intervals of ground. There are thirteen to the vent; on the posterior half of the body they divide on the vertebral line, and alternate; one is thus continuous with two of an opposite side, leaving the ground in lateral squares. Head above, including occipitals, a lighter speckled brown above, leaving a white collar. A black band from eye to angle of mouth, and a second from below the eye to mouth, parallel to the above, encloses with it a light band; a black band from eye to nostril; lips in front black spotted. Total length 16.25 inches; of mouth 7 lines; of tail 4.25.

Habitat. The western region of Mexico, near the Isthmus of Tehuantepec, two specimens (251-261) sent to the Smithsonian Institution by Francis Sumichrast. This serpent approaches very near the *L. pacifica* Cope in details, but differs totally in coloration. The structural differences are the following:

L. mystacina.

Head elongate oval;

Preocular reaching frontal;

Prefrontals longer than wide; P. f. wider than long.

Fifth labial to occipital;

L. pacifica.

Head short wide.

Preocular not reaching.

Prefrontals longer than wide; P. f. wider than long.

Fifth labial not to occipital.

TRIMORPHODON, Cope.

Proceed. Acad. Nat. Sci., Phila., 1861, 297.

This peculiar genus, hitherto not found outside of the Mexican, Central-American and Sonoran districts, is well illustrated by the collections received by the Smithsonian Institution. Two species have been hitherto known, and I now add three others, as follows:

I. Scales in 21-3 Rows.

Seven (six) superior labials; three loreals; head black in front with a white T shaped mark; back with uniform black rhombs.

T. TAU.

Eight superior labials; head broad, short; three loreals; head dark-brown, with light cross-bar on muzzle and between eyes, and V on occiput; body with broad brown annuli; tail one-fifth the total.

T. UPSILON.

Nine superior labials; head long, swollen behind; two loreals; head with a lyre-shaped pattern, back with irregular rhombs, with pale centres; tail one-sixth the length.

T. LYROPHANES.

Nine superior labials; head long; two loreals; head with chevron bands; body with irregular pale centred rhombs.

T. BISCUTATUS.

Scales in 27 Rows.

Nine superior labials, three loreals; head elongate; two dark cross-bands and two chevrons on head; back with very irregular rhombs, with pale centres; tail one-sixth.

T. MAJOR.

TRIMORPHODON TAU, *Cope*.

Scales in twenty-three series. Muzzle projecting considerably beyond the mouth. Rostral plate somewhat produced behind; internasals, about one-fourth size of prefrontals, which are long as wide. Frontal with straight lateral margins, which are longer than anterior. Occipital not longer than frontal, regularly rounded behind. Nostril in middle of nasal. Three loreals, three post and three preoculars. Temporals, 2-3-4. Superior labials six, the fifth probably composed of two plates fused, as it is twice as long as deep, on both sides. The fourth and fifth enter the orbit, the third is cut down by the lower loreal and preocular. Inferior labials, eleven. Body strongly compressed. Total length 0m. 236; of tail, .035 m.

Above gray, with twenty-three jet-black rhombs, which extend to the gastrosteges by their lateral angles. Tail with ten rhombs; all everywhere unspotted with paler. Sides of belly black spotted. Head gray with a black mask above as far as the middle of the occipitals, but with two lateral ear-shaped prolongations on the same; a pale T-shaped mark extends transversely between orbits, and longitudinally to end of muzzle.

One specimen, No. 236, from F. Sumichrast, from the western part of the Isthmus of Tehuantepec, Mexico.

TRIMOPHORDON UPSILON, *Cope*.

Internasals broader than long, prefrontal broad as long, frontal with parallel outline not reached by the preocular. Oculars 3-3. Nasals distinct, loreals three, forming an L. Temporals 3-3-3. Fourth and fifth labials in contact with orbits. Twelve inferior labials. Scales in 2-3 series. Body with twenty-four brown annuli, which are broken into irregular spots on the belly, and are broader than long on the vertebral line. On all but the anterior third the length, a vertical brown bar stands between these on the sides. Chin and lips white, superior plates brown spotted above. Loreal region spotted. Temporal and occipital region brown with a pale Y on the occipital common suture. Total length 0.34 m. Tail .052 m.; head to aictus .011 m.

One specimen in Mus. Smithsonian from I. I. Major, from Guadalajara, West Mexico.

TRIMORPHODON MAJOR, Cope.

This large species has a head of lanceolate form; the body is compressed and the tail slender. The large number of series of scales characterizes it most distinctly. Gastrosteges 258, anal 1-1, urosteges 88. The preocular does not reach the frontal; temporals 3-4-5. There is a broad brown band across the muzzle and chevron, ceasing between the eyes, whose limbs are lost above the rictus ovis. A second chevron behind this is closed by a spot connecting the limbs behind. The dorsal rhombs extend to the gastrosteges, and are manifestly formed by the union of four spots, two vertebral, and one on each side; they enclose three spots of the ground in a cross-row.

Two specimens from near Tehuantepec from Francis Sumichrast.

TELEOLEPIS STRIATICEPS, Cope, sp. et gen. nov.

Character genericus. Dentition diacranterian. Cephalic shields normal; two nasals, the nostril in the anterior one; the loreal region with a deep longitudinal groove. Scales equal, smooth, biporous; anal shield entire. Tail short, body slender; head wide, very distinct.

Disregarding the scale pores, this form might be regarded as a near ally of *Xenodon*, or perhaps of *Opheomorphus*, for it has the head of the first and the body of the last. The importance of Reinhardt's scale pores I have often had occasion to observe, and I believe their absence or single or double existence to be as important indices of natural groups as any other structural feature. In general, Reinhardt's tables show that subterranean and aquatic Colubrine serpents do not possess these pores, while the more highly developed and typical forms of a more aerial life possess them double; the Coronelline forms of an intermediate character, possess single pores, though frequently none, and rarely two.

Teleolepis agrees with *Alsophis* in many technical characters, except in having a single anal shield, but the latter differs especially in its excessively elongate tail. A close approach appears to be made by *Zamenis*, but here the anal plate is double also. *Bothrophthalmus* Schleg. a *Lycodont*, presents the peculiar loreal groove.

Character specificus. The body is rather compressed, the urosteges not angulate. The scales are in nineteen longitudinal series, and are rather wide on the dorsal region. The length of the tail enters the total 5.66 times. The head is broad and flat, and the neck narrow. The rostral plate is flat, and slightly visible from above. The internasals are little shorter than the prefrontals, but not so wide. Both nasals are visible from above, but not the loreal; the preocular reaches the frontal. The latter is as long as the occipitals and rather narrow, with concave borders. Each occipital is as broad as the middle suture; the superciliaries large. The eyes are large and with round pupil.

Nasals about equal; the loreal with a curved supero-posterior margin, which invades the single preocular; postoculars three, the superior in contact with occipital only, the inferior the largest, joining only the fifth and sixth superior labials. The temporals are very small and number 2-3-4. Superior labials eight, fourth and fifth entering orbit; sixth

quite elongate, last two each longer than high. Inferior labials nine; geneials equal, not elongate. Gastrosteges 189, urosteges 70. Total length of a young animal 0m 30; of tail 0m 03.5.

Color above light brown, with a dorsal series of transverse quadrate deep brown spots extending from nape to middle of tail; they extend over seven and two half rows of scales, and are restricted by a light yellow line, which extends on each side the back. The spots are yellow-edged anteriorly and posteriorly. The sides are marked with two rows of alternating pale brown blotches, of which the superior is opposite the dorsal series. There is a triangular dark edged yellow spot on the extremity of each gastrostege; belly closely brown punctate. A blackish band extends from the rostral plate to the side of the neck, and three similar bands with pale middles extend on the top of the head to the nape. Lips and chin yellow, brown blotched.

This species was found by Geo. Seeva, of the Thayer Expedition to Brazil, and is No. 909, Mus. Comparative Zoology, Cambridge, Mass.

LYGOPHIS LACHRYMANS, Cope.

This species repeats the generic characters of *Lygophis* in the diacranterian dentition, lack of scale pores, tail of medium length and normal scutellation.

Scales in seventeen series, obtuse. Muzzle short, rostral shield not as high as wide, not prominent. Internasals broader than long; frontal broad, shorter than occipitals, with a right angle behind. Superior labials eight, fourth and fifth only in orbit, sixth only higher than long. Loreal longer than high; oculars 1-2, the anterior not reaching frontal; temporals 1-2. Inferior labials large, nine; pregeneials shorter than postgeneials. Gastrosteges 173; anals 1-1; urosteges 78.

Color above, chestnut brown; ends of gastrosteges and first three and a half rows of scales blackish, yellowish margined above from side of neck to end of tail. On the anterior half the body is divided by a yellowish band on the first and second rows of scales. Below and labials bright yellow, the anterior superior labials brown margined. A deep brown band from eye across sixth labial, another across seventh, and a black spot on side of neck. Head above brown. *Habitat*, unknown.

This species is remotely like *Coniophanes fissidens*. It differs from *Rhadinaea taeniolata* Jan. (*Enicognathus*) in the broader frontal, and the lip bands as well as uniform back.

ALSOPHIS RIJGERSMAEI, Cope.

Six specimens of this species serve to represent its characters. In three the scales are in 23 series, in one in 21. The loreal plate is longer than high, and with a straight superior suture, except on one side of one individual, where it is angulated above as in *A. antillensis*. The muzzle projects considerably beyond the mouth, but the rostral plate is not prolonged on its upper surface. Superior labials eight, third, fourth, and fifth in orbit; these with the sixth are the only labials higher than long. Temporals 1-2 the anterior in contact with inferior of the two postoculars only. One preocular occasionally divided and not reaching frontal.

Nasals different in size, the anterior much smaller and not more elevated than the loreal. Muzzle very narrow, internasals longer than broad, vertical elongate and contracted by the concave superciliary sutures, its anterior suture one-half its length, which equals the common occipital suture. Occipitals emarginate behind. Gastrosteges 201, 201, 204, 210; anal $\frac{1}{2}$; urosteges 100, 122, 108, 100. Length 37.25 inches, of which the tail measures 3.25 inches.

Color, dark slate brown above, with a number of blackish cross-bands behind the head, which are sometimes quite indistinct and sometimes separated by paler bands. A broad brown band from the nostril through the eye which expands and is lost on the temporal region, though its lower boundary is continued as a line on the side of the neck. The scales on the median dorsal line have a white border. Belly, the posterior half black, anterior yellowish, gray spotted. Upper labial region orange, brown spotted; gular region grayish brown and orange mingled. Frontal and occipital plates dark medially. This species is in general appearance much like the *A. sanctaecrucis*, but it has the loreal plate of the *A. angulifer*, and several more series of scales than either. The frontal shield is of a narrower form than in either *A. sanctaecrucis* or *A. antillensis*.

Habitat. So far as yet known, this distinct species is confined to the small island of St. Martins, in the Spanish West Indies, which has an area of only about thirty square miles. Six specimens were sent to the Academy Natural Sciences by Dr. R. E. Van Rijgersma of that island. I dedicate the species to him in recognition of his labors in endeavoring to lay a basis for the complete zoology of that island.

XENODON ISOLEPIS, Cope.

Eight superior labials, fourth and fifth entering orbit, sixth the largest, exceeding the seventh. Anal shield bifid. Scales of the body in nineteen series quincuncially arranged of equal size and form, one pitted. General arrangement that of a *Coluber*; the body is also as in that type entirely cylindric. Oculars 1-2; loreal little higher than long; postnasal highest; rostral not prominent. Temporals 1-2. Frontal longer than wide, longer than occipital.

Gastrosteges 156; urosteges 55.

Color uniform leaden above, flanks greenish, below dirty white. Posterior tooth rather short. This species is nearest in technical characters to the *X. neovidii* Gth. but differs entirely in color, and the equal size and form and quincuncial arrangement of the scales. The sixth upper labial is according to Gunther's figure (*Ann. Mag. Nat. Hist.*, 1863, V. C.,) much smaller than the seventh; here the latter is distinctly smaller than the former.

From Pebas Ecuador on the upper Amazon. Received from Professor James Orton, of Vassar College, New York. A collection recently received from that gentleman from the same locality embraced the following species, all of which are in the Museum of the Academy Natural Sciences, presented through the liberality of Prof. Orton.

*Testudinata.**Chelys matamata.**Ophidia.**Typhlops reticulatus*, L.*Tortrix scytale*, L.*Rhabdosoma microrhynchum*, Cope.*Leptodira annulata*, L.*Oxyrhopus clelia*, L.*Xenodon isolepis*, Cope.*Herpetodryas carinatus*, L.*Himantodes*.*Leptognathus catesbyi*, D. B.*Elaps lemniscatus*, Linn.*Elaps imperator*, Cope, (*E. batesii*, Gthr.)*Elaps scutiventris*, Cope.*Bothrops bilineatus* (27 series of scales only.)*Lacertilia.**Amphisbaena alba*, L.*Amphisbaena fuliginosa*, Schreb.*Amiva surinamensis*, Gray.*Thecadactylus rapicauda*, Houtt.*Anolis viridiaeneus*, Peters.*Batrachia.*

Pithecopus tarsius, Cope. Specimens with head and body five inches in length.

Pithecopus tomopternus, Cope.*Hyla marmorata*, Daud.

Hyla leucophyllata, Beireis. A curious variety with a round or discord blackish spot on the vertex, brown lateral band from end of muzzle, and whole under surfaces a bright salmon color. Another variety apparently has been named *Hyla triangulum* by Günther, P. Z. S. Lond., 1868.

Scytotis allenii, Cope.*Bufo naricus*, Spix.*Bufo margaritiferus*, Merr.*Pipa surinamensis*, L.*ELAPS SCUTIVENTRIS*, Cope.

Form slender, tail short, thick. Oculars 1-2; superior posterior with its inferior suture continuous with that of the occipital. Superior labials seven, third and fourth in orbit, all except the first higher than long, none reaching occipital. Temporals 1-1. Superciliaries broad as long; prefrontals and internasals of equal length, the former much the wider. Rostral broader than high, not prominent. Symphyseal largely in contact with pregenaeals. Scales in fifteen series. Gastroteges 274; anal divided; urosteges 15.

Above black, except a broad yellow head-band, which extends from the posterior margin of the prefrontals to that of the occipitals. Tail with

one or two crossings above. Below black, with large transversely oval yellow spots, which extend to the third row of scales, and include three or four gastrosteges at intervals of the same width. Length, 17.5 inches, tail, 7 inches.

From Pebas on the Amazon in Equador. From Prof. Orton.

This species appears to be nearest the *E. narducci* of Jan.

TRIGONOCEPHALUS (Bothrops) ARBOREUS, *Cope*.

Scales in thirty-five longitudinal series, all carinate except the inferior. Eight superior labials which diminish in size posteriorly, bounded above behind posterior line of orbit by seven small scales, which are not distinguishable from those of the temple. Second labial forming anterior boundary of fossa; two rows scales between fourth and orbit. Inferior labials eleven. Three scales on the canthus above, the anterior two large, forming with a pair on top of the muzzle a shielded space of six plates. Superciliaries large, separated by nine rows. Gastrosteges 201, urosteges 64 pairs. The body is much compressed, and the coiled tail with slightly expanded prehensile extremity, appropriately to arboreal life.

Color, greenish yellow, the first series of scales yellow, ends of the gastrosteges with a green line. Dorsal region with faint brownish yellow spots often paired; many scales black edged. Labial scales of both jaws black edged; a black band with yellow interruptions from eye to angle of mouth.

This handsome and venomous tree serpent was discovered by Dr. Otho Wucherer, near to Bahia, Brazil. It is a near ally of the *B. bilineatus* of Nieuwied, but that animal has 27-9 rows of scales, and the top of the muzzle is scaled, (as given by Schlegel in the atlas of his *Physionomie des Serpens*), and the color is slightly different.

TRIGONOCEPHALUS (Bothrops) PUBESCENS, *Cope*.

Scales in twenty-three rows, all including the inferior, keeled. Eight superior labials, the fourth longest, and separated from the orbit by three rows of scales. Second not extending to the front of the maxillary pit. Posterior labials quadrate shorter. Seven rows of scales between superciliaries; two on canthus rostralis above, besides the edge of the preocular. The anterior quite large, flat, the second separated by five rows scales. Maxillary, palatine and pterygoid, mandibular and laryngeal margins with the fang sheaths, silky pubescent, forming short longitudinal fringes. Color, brown, with blackish brown spots on each side from vertebral line to fourth row of scales. The spots are rounded and pale edged and alternating. They are divided by a longitudinal line of the ground near their middle. There are in their intervals above, round pale edged brown spots. A brown band from eye to angle of mouth, pale edged below; a similar band across head *in front of superciliaries*; two divergent brown spots behind the same plates, and two divergent brown bands behind these, all yellow edged. Sides of face and throat thickly brown dusted. Belly closely brown spotted; widest spots near end of gastrosteges. Gastrosteges 182, urosteges 25.

One specimen of this serpent was brought by the Thayer expedition

from the Rio Grande do Sul, Brazil. It is nearest the *B. nieuwendii*, Spix, but may be distinguished by the extraordinary character of the silky fringes in the mouth as well as by the entirely different coloration. In the latter respect it is rather more like *B. diporus*.

CNEMIDOPHORUS GRANDENSIS, Cope, *sp. nov.*

Char. Ten series of abdominal plates; brachium plated; two frontoparietals. Green with 2-3 white longitudinal lines on each side, a row of brown spots between the two superior and above the more dorsal of the latter.

Description. The nostril is anterior to the naso-frenal suture. Infra-labials four, separated from labials behind by one series flat scales (not granules), mesoptychium entire, with 3-4 rows plates, some small ones on the margin, except at middle. Supranasals in contact; also the prefrontals. Frontal single, much angulate in front. Supraorbitals four, not separated from frontals and frontoparietals by granules. Two pairs wedge shaped parietals, interparietal parallelogrammic as large as one pair. Scutellation minute, caudal scales strongly keeled. Brachials and antibrachials continuous, latter in two rows only; former continuous with postbrachials, the two forming together five rows, all smooth. Nine femoral pores. Anals continuous with abdominals, composed of one large median plate, margined laterally and behind by six plates, the two posterior marginals.

Coloration.—The inferior lateral pale line is interrupted and not well marked; sides pale green, between and above the superior lateral lines, brown; median dorsal line bright green. Nineteen brown spots between nape and rump above upper line, those below rather fewer. Femur with two pale streaks behind, tibia and fore-arm spotted in front. Belly and throat uniform yellow.

Habitat. The Rio Grande, Brazil, brought by Capt. George Harrington, and presented to the Essex Institute, Salem, Mass., (No. 388,) Museum Academy Natural Sciences, Philadelphia.

This species only resembles the *C. murinus*, D. B., and the *C. heterolepis*, Tschudi in the increased number of its abdominal shields. In *C. murinus* the brachium is altogether granular, while the *C. heterolepis* differs in having but one frontoparietal plate, and only two parietals, with frontoparietal smaller than either. It is from Peru.

On account of the united frontoparietal shields I refer *C. hyperythrus*, Cope as type, and *C. heterolepis*, Tschudi, as second species of a genus different from the present, under the name of *VERTICARIA*.

Measurements of *C. grandensis*.*

Total length.....	0m 19.2	Fore limb.....	0m 02
“ to vent.....	0m 06.5	Hind “	0m 036
“ to collar.....	0m 01.9	“ foot.....	0m 2

AMEIVA ANALIFERA, Cope, *sp. nov.*

Of the group of *A. plei*, *i. e.*, with twelve ventral series of scales, no

* In the legal measure of the United States the metre and decimal fractions.

heel spurs, and one frontal plate. The tibial shields in three rows, the outer much larger, and outer toe longer than inner. It differs from that species in having the prebrachial shield small, and in three sub-equal longitudinal rows, graduating into the large prebasals regularly, in having ten or eight regular marginal anal plates, the median pairs not abruptly larger, and in not having a series of black spots on the sides. The teeth are from the nostril posteriorly 9 canine like, and seven or eight obtuse molars, two or three posterior usually with a lateral cusp. Two median plates in front of the anals. Gular scales in a transverse band of about nine rows, larger; relatively larger also than in *A. plei*, also the latter has several rows of scales between the labials and infralabials; the *A. analifera* but one row.

Greenish yellow below, brownish olive above, with blackish cross-shades on the nape in St. Martin's specimens. Sides, groin and tail above white spotted; some white spots in rows across the rump.

	In.	Lin.
Total length (two inches of tail reproduced).....	13	
End muzzle to vent.....	4	6
Hind limb.....	3	1.5
Foot.....	1	6
Fore limb.....	1	8
Head including membr. tympani.....	1	1.5

Several specimens in Museum Academy from the island of St. Martins, West Indies, presented by Dr. R. E. Van Rijgersma, correspondent of the Academy at that place; also one specimen from the adjacent island of St. Bartholomews, from Dr. A. H. Goës of that island. The following species were included in the collection of Dr. Rijgersma.

IGUANA NUDICOLLIS, Cuv. This species occurs also in the Swan Islands off the coast of Honduras; Museum Columbia College, New York.

ANOLIS GINGIVINUS, Cope, P. A. N. S., Philadelphia, 1864, 170.

AMIVA ANALIFERA, Cope, supra.

MABUIA AENEA, Lacep.

ALSOPHIS RIJGERSMAEI, Cope, supra.

HYLODES MARTINICENSIS, Dum. Bibr.

SCELOPORUS SINIFERUS, Cope.

Twenty-four transverse series of scales between interscapular region and rump. Seven longitudinal series at the latter point, ten at the former. Lateral scales large, nearly equalling the ventral, which are considerably smaller than the dorsal. All well keeled and mucronate, except the ventral, which are smooth and without mucro or emargination, except a few spinous series in front of the vent. Gular scales entire. Palms and soles strongly keeled; tail slender, its scales strongly keeled like those of the back. Male with three, female with six femoral pores. No granular space in front of shoulder, and no longitudinal folds in the same region, but a short vertical fold in which the skin is so deeply inverted as to

form a deep pocket extending more than half way to the tympanum, and with some subdividing folds. No auricular scales different from the temporal; all strongly keeled.

Two pairs of supranasals, two pairs frontonasals separated by a small internasal. Frontal divided transversely and longitudinally; frontoparietals small. Parietals small, transversely divided; interparietal large, broader than long. Supraorbitals four on each side, preceded by three scales, and bounded inwardly and outwardly by much smaller scales. None striate; those on muzzle weakly one keeled.

	In.	Lin.
Total length.....	6	8.2
Length to vent.....	2	1.4
“ to axilla.....		10.2
“ to canthus oris.....		5.3
“ hind limb.....	1	8.4
“ “ foot.....		10.1
“ fore limb.....		10.6
Width head.....		4.8

This species is comparable to *S. oligoporus*, Cope, in the large scales and few femoral pores, but differs much in the division of the frontal plate, large interparietal and cervical pocket. It is considerably smaller and of different coloration.

Numerous specimens in Smithsonian collections from Francis Sumichrast, from the Pacific side of the Isthmus Tehuantepec.

LIYLA RUGULOSA, Cope, *sp. nov.* Cystignathidarum.

Prefrontal bones in close union with each other and the fronto-parietals. Vomerine teeth present; auditory apparatus well developed. Manubrium cartilaginous, xiphisternum emarginate. Toes webbed; dilata-tions well developed, supported by T-shaped phalanges. Abdomen nearly smooth.

This genus is very near to *Hylodes*,* differing almost entirely in the webbed toes. Keferstein, who has just described this genus (*Archiv. f. Naturgesch.*, 1868, 926), in consequence of his adhesion to the system of Günther, has attained to a very confused idea of its affinities.

Character Specificus.—Head broad, body short; heel extends to end of muzzle. Vomerine teeth in two approximated fasciculi, much behind the posterior line of the nares. Choanae half the size of the ostia pharyngea. Tongue oval, one-fourth free, openly emarginate behind. Tympanum nearly as large as orbit. Skin thin, with sundry rugosities on the sides of the dorsal region. Muzzle acuminate, not projecting; nostrils nearly terminal. Canthus rostralis well marked, lores slightly concave; front a little convex. Tarsal fold slight, metatarsal tubercle one inner. Solar web to the middle of the first (proximal) phalange on the first and fifth digits; to the base of the same on the others. Third

* *Lithodytes rhodops*, Cope, *Pr. A. N. Sci., Phil.*, 1866, 323 is *Hylodes saltai*, Gthr. *P. Z. S. Lond.*, 1868.

digit very elongate. Anterior toes free; lengths 2-4-1-3. A weak discoid abdominal dermal fold. Abdomen very obscurely areolate, medially nearly smooth.

Color blackish-brown above, sometimes with pale vertebral streak. Femora not marked behind; above with three oval brown areas enclosed by light lines. A black band between orbits. A dark band from orbit to nostril, and thence to lip; two similar bands from orbit to lip. Below unspotted white, except gular region, which is brown.

Length head and body.....	0m. .037
“ “ to posterior line tympanum.....	.014
Width “ at canthus oris.....	.0145
Orbit to end muzzle.....	.0049
Length fore limb.....	.0215
“ “ foot.....	.0105
“ hind foot minus tarsus.....	.0185
“ “ limb.....	.064

Habitat. Two specimens of this new form were sent to the Smithsonian Institution by Dr. Francis Sumichrast from the Pacific region of the isthmus of Tehuantepec, Mexico.

The collection sent from this locality embraced the following thirty-six species.

CROCODILIA.

CROCODILUS AMERICANUS, Seba; various large specimens, which display the most remarkable variations in the number and position of the osseous scuta. They exhibit from two to four nuchal scuta, and from two to five cervical. In several specimens scuta of the external dorsal series meet on the median line, excluding the inner pair entirely.

TESTUDINATA.

CHELOPUS RUBIDUS, Cope Supra.

LACERTILIA.

HELODERMA HORRIDUM, Wiegmann.

CNEMIDOPHORUS, sp.

UTA BICARINATA, *Phymatolepis bicarnatus* Duméril.

SCELOPORUS SINIFERUS, Cope.

SCELOPORUS VARIABILIS, Wiegmann.

CYCLURA (*Otenosaura*) *QUINQUECARINATA*, *Enyaliosaurus quin.* Gray. Catalogue of Sauria in Brit. Mus. This region is the undoubted home of this hitherto rare species, as Sumichrast finds it in abundance. Gray was unable to assign its habitat.

CYCLURA (*Otenosaura*) *ACANTHURA*, Wiegmann.

IGUANA RHINOLOPHA, Saur. Probably only a variety of *I. tuberculata*.

OLIGOSOMA GEMMINGERI, Cope.

PHYLLODACTYTUS TUBERCOLATUS, Wiegmann.

OPHIDIA.

STENOSTOMA.

OGMIUS VARIANS. *Oxyrhina varians* Jan. This genus is strongly glyphodont like *Stenorhina*. Prof. Jan considered it is isodont. His name *Oxyrhina* has been used variously before, on which account I propose the name above given. For a synopsis of genera allied to *Ogmios*. See Silliman's Journ. Sci. Arts, 1864, 457.

STENORHINA VENTRALIS, D. B. A form with series of dots on the scales, confirming the identity of the lined var. *freminvillei* with the species.

OPHIBOLUS POLYZONUS, Cope.

CONIOPHANES PICEIVITTIS, Cope.

CONOPHIS VITATTUS, Peters.

TOMODON NASUTUS, Cope.

OXYRHOPUS CLELIA, Linn.

LEPTODIRA MYSTACINA, Cope.

LEPTODIRA ANNULATA, Linn.

TRIMORPHODON BISCUTATUS, D. B (Dipsas).

TRIMORPHODON TAU, Cope, supra.

SYMPHIMUS LEUCOSTOMUS, Cope, supra.

MASTICOPHIS MARGARITIFERUS, Schl.

OXYBELIS ACUMINATUS, Wied.

ELAPS AGLAEOPUS, Cope.

ANCISTRODON BILINEATUS, Gthr.

BOTHRIECHIS BRACHYSTOMA, Cope.

BATRACHIA.

LIYLA RUGULOSA, Cope.

CYSTIGNATHUS MELANONOTUS, Hallow.

CYSTIGNATHUS GRACILIS, D. B. Not distinguishable from specimens in the Mus. Compar. Zoology from Uruguay, except in less depressed extremity of the muzzle. The same species from Vera Cruz.

SCYTOPIS ALLENII, Cope.

Fingers free and teeth in fasciculi between nares and otherwise generally as in *P. xsignatus*; but the muzzle is broadly rounded, there is a black band from eye to middle of sides, followed by numerous large black spots on yellow ground; femora not cross-barred above, with large light spots on black ground.

The black scapular bars of this species are broad, and are not angulated and converging as in *S. xsignatus*, but are parallel; two black bars on sacral region diverge towards the groin. There are several black spots in the axilla, and longitudinal black line on front and back of humerus and three on front and under side of humerus. Tibiae vermiculated on

under surface above with an incomplete outlining of cross bars. Teeth between nares. Proportions of limbs generally as in the common variety of *S. xsignatus*; head equal foot beyond tarsus less the last phalange and two-thirds the tibia; foot 1.5 head and body. Orbit equal muzzle to beyond nares; belly immaculate, throat smooth. Heel nearly to nares. Length head and body 15.25 lines.

Habitat. Para Brazil. One specimen, No. 473 Mus. Comp. Zoology, Cambridge, Mass. Pebas Ecuador, Prof. Orton. Named for my friend, Prof. Harrison Allen, of the Pennsylvania University.

HYLA PULCHRILINEATA, Cope.

Form that of *H. arborea*. Fingers free, toes webbed to the base of the penultimate phalange. Dilatations well developed. Vomerine teeth in a single transverse series opposite the posterior margin of the internal nares; the latter much larger than the ostia pharyngea. Tongue slightly free behind. Canthus rostralis distinct, lores concave. Eyes large, prominent; membranum tympani one-fourth their size. The skin is smooth above, and the areolae of the abdomen are unusually weakly developed. No dermal appendages to the limbs or body. The extended hind limb brings the heel to the front of the orbit.

	mm.
Length total axial.....	38.
“ to eye not axial.....	58.
“ to posterior margin tympanum.....	11.7
“ fore limb.....	22.8
“ hind limb.....	58.5
“ foot.....	24.5
“ tarsus.....	12.
Width at canthus oris.....	12.4

Ground color above pale ashy brown. A strong citron yellow band passes round the muzzle, below the tympanum, and along the side to the groin. On the side it is wider, slightly undulating, and bordered above and below with slate color, which forms a pale blotch below it on the groin. A narrow unmargined, bright citron yellow line extends from the end of the muzzle to the vent, medially; and a similar one passes above the canthus rostralis and orbits along a line equidistant between the vertebral and lateral lines, joining the latter at the groin. The femora are finely yellow above and behind, and a yellow longitudinal line marks the tibia on both the inner and outer sides. The pigment of the metatarsus does not extend on the outer digit.

This pretty and uniquely marked species was brought by William M. Gabb, member of the Academy and Chief of the Geological Survey of the Island of San Domingo, from the eastern part of that island. The thumb can be opposed to the fingers as in the species formerly referred to *Litoria*.* The sacral diapophyses are narrower than usual in the genus. The fronto-

*Two species were described by Dumeril as *L. marmorata* and *L. punctata*, from Australia. On the union of these with *Hyla*, I changed their names to *H. thyposicta* and *H. dimolops* respectively (Journ. A. N. Sci., 1866, p. 85), as there were *Hylae* already described under those names.

parietal bones are more extensively ossified than in most species of *Hyla*, and constitute an approach to *Scytotis*,* Cope. The species is the first true *Hyla* discovered in the West Indian subregion.

The species brought by this naturalist from the same locality are :—

Dromicus parvifrons, Cope.

Uromacer catesbyii, D. B.

Amphisbaena innocens, Weinl.

Anolis semilineatus, Cope.

Anolis cælestinus, Cope.

Anolis distichus, Cope. *A. dominicensis* Lützk. is a variety of this species.)

Anolis cybotes, Cope. *A. rüsei* Reinh. and Lützk.

Trachycephalus marmoratus, D. B. var.

Hyla pulchrrilineata, Cope.

Lithodytes ricordii, Dum. Bibr.

It may be mentioned in this connection that a valuable catalogue of West Indian Reptiles and Batrachia was issued by Reinhardt and Lütken in 1863 in the *Naturalist. Foren. Vidensk. Meddel. Kjobenhavn*. A few *doubles emplois* occur in its pages, as follows. Their *Anolis trinitatis* I think is a variety of *A. alligator*, D. B. Numerous specimens are in Mus. Smithsonian. *Amphisbaena antillensis*, Rhdt. and Lützk. is *Diphalus fenestratus*, Cope. *Liophis Andreae*, R. & L., is the young of *Dromicus fugitivus*, Donnd. *Hylodes rüsei*, R. & L., is *Lithodytes lentus*, Cope, and *H. antillensis* is *H. auriculatus*, Cope. Though this paper of the Danish naturalists was read one month before that of the writer, in which these *Hylodes* were described, it was evidently published much later, as they quote in it a paper of the writer's, which was not issued till 1863.

Among West Indian Anoles it is to be added, that the *A. grahami* Gray is established on a young *A. iodurus*, and that *A. porcatus* is *A. principalis*; also that *A. stenodactylus* is not a valid species.

HYLA POLYTAENIA, Cope.

Hyla rubicundula, "Reinhdt. & Lützk." Günther P. Z. Soc. Lond., 1868, 489, Tab. X, fig. 3, nec. Reinh. et Lützk.

Fingers one-third palmate; toes only palmate to the extremity of the basal phalange of the longest toe. No dermal margins on body or limbs. Tongue entirely attached behind. Vomerine teeth in short transverse fasciculi entirely behind the line of the posterior margin of the inner nares. Choanae smaller than nares. Tympanum less than one-fourth eye. Skin above everywhere smooth. Digital dilations moderate; eye large; head wide; muzzle short; loreal region concave.

* Four species of this genus are enumerated in my genera of *Arcifera* (*Journ. Acad.* 1866) but were not named. They are *S. venulosus* (*Hyla* Daudin); *S. acuminata* (*Hyla* Cope); *S. allenii* Cope and *S. ruber* (*Hyla* Daudin).

	Inches.
Length from end muzzle to orbit.....	.20
“ “ “ behind tympanum.....	.40
“ “ “ veub (oxial).....	1.30
“ of fore limb.....	.90
“ of hind limb.....	2.00
“ of foot.....	.90
“ of harsus.....	.56
Diameter eye.....	.39
Width head behind.....	.41

The pigment of the upper surfaces extends to near the edge of the lip and in a band on humerus and femur, covering three outer fingers, an outer metatarsus and two outer toes. A grey-brown band extends along the border of the lip above the axilla to the groin; a second and wider extends from the nares through eye and tympanum to groin. In our specimen the reddish-cream color of the dorsal region is marked with indistinct dap; in a second, with nine longitudinal grey-brown lines, of which a vertebral, and one from above the lores and over each orbit to groin are band-like. In both, a similar band bounds the antebrachium, tibia and metatarsus, and the posterior margin of the pigment on the femur. In the lined specimen there are additional lines on the lips humerus and femur.

This species has the opposable thumb and slight palmation of some of the Hylae referred to Litoria. It is in general allied to *H. palliata*, but has the toes much less palmate, and the vomerine teeth more posterior.

This species is figured by Günther as the *H. rubicundula* of Rhdt. & Lütke, as above. It is however not that species, which differs according to the original description in Danish, in first, having the vomerine teeth between the nares: second, in having the tongue half free; third, the palmation of the feet extends over one phalange more, and fourth, that of the fingers is better developed.

From Brazil; collected by G. Szeva, of the Thayer expedition to that country, under Prof. Agassiz. No. 906 Mus. Comparative Zoology, Cambridge.

STEREOCYCLOPS INCRASSATUS, *Cope, sp. et. gen. nov. Phryniscidarum.*

Char. gen. Of section I. of Phryniscidae with Hypopachus and Calophrynus. The prefrontals are fully developed and form a continuum with each other and with the fronto parietals. Tongue large. Membrum tympani thin, concealed. No dorsal or parotoid gland; no metatarsal shovel. Coccyx united by two condyles. Xiphisternum cartilaginous, much dilated and entirely in contact with the coracoids. Anterior portion of the sclerotica ossified, so as to form a hard annulus round the cornea. Pupil round. Toes free.

Char. Spec. The whole form is much depressed, and the physiognomy approaches Pipa. The cranial box partakes of this and presents a strong median longitudinal crest. Tongue large; equal inner nares. A short

frenum across the palate behind. The vomer is cartilaginous between the nares, except on axis. Gape large, the muzzle projecting slightly beyond it. No canthus rostralis, nostrils latero-superior. Limbs short, humerus and femur included in the skin. Toes very unequal, the inner and outer very short; related thus, 1-2-5-3-4. An obtuse tubercle at the base of the outer toe. The epidermis is everywhere thickened by a chitin-like deposit, which is readily cracked. It is thickest on the soles, the tarsi, and the gular region.

Color everywhere leather-brown; a narrow white line from end of muzzle to vent.

	MM.
Length of head and body.....	.057
“ “ hind limb from knee.....	.0495
“ “ tarsus.....	.009
“ “ remainder of foot.....	.0245
“ “ fore limb from elbow.....	.0200
Width between angles mandible.....	.020
“ “ orbits.....	.009
“ “ nostrils.....	.004

Found near Sao Matheos, south of Rio de Janeiro, by Messrs. Hartt and Copeland, of the Thayer Expedition to Brazil, Mus. Comparative Zoology, Cambridge, Mass., No. 855.

This is a remarkable type, with a certain resemblance to *Engystoma*. It is the first type among the *Raniformia* which betrays even a remote resemblance to *Pipa*.

HYPOPACHUS INGUINALIS, Cope, *sp. nov.*

This species is of about the same size as the *H. variolosus* Cope, and like it has the toes partially webbed at the base. It differs by many marked characters throughout.

Muzzle rounded conic, projecting beyond lip; nostrils superolateral. Width of head behind orbits, double length to opposite the same point. A groove from orbit to humerus. Diameter of former equal length of muzzle from the same. Mandible with symphyseal knob little marked; gular slits large; tongue flat, ovate, largely free and thin behind, without free border in front. Nares large, double the small ostia pharyngea. Two metacarpal tubercles close together; fingers slender, with subarticular knobs. The metatarsal tubercles with cutting edges in nearly the same line without blackening of the sheath, the inner the longer. No tarsal fold. Skin everywhere smooth, except some minute papillae on the sacro-coccygeal region.

Coloration. Above a pinkish leaden, with a more or less indistinct narrow vertebral line from the end of the muzzle. A large and a small black spot on the groin and one on the knee. A large black spot on the scapula; a pair of blackish lines which converge from the orbits to the inter-scapular region, then diverge and form an imperfect circle on the middle of the back. Sides of head blackish; a yellow bar from orbit to humerus. A black bar across closed femur and tibia above. The femur

is a strong pink, and is sometimes spotted behind and sometimes not. Belly with delicate reticulate brown lines on yellow ground, sometimes obsolete. Total length, 04'' 4''' ; do. to orbit behind, 8''' . Fore limb, 02'' 2''' ; hand, 01'' . Hind limb, 04'' 1''' ; tarsus, 9''' . Entire foot, 02'' 03''' .5.

Habitat. Vera Paz, near the ruins of Coban. Sent to the Smithsonian Institution by Henry Hague. This gentleman has made highly interesting observations on and contributions to the Natural History of that once populous, but now almost unknown region, which have been communicated to the Smithsonian Institution.

The known species of this genus is *Hypopachus variolosus* Cope (*H. seebachii* Keferstein Göttingen, Nachrichten, 1867, 352. Archiv. f. Naturgesch., 1868, 293, tab. IX., f. 1, 2. *Engystoma variolosum* Cope. Proceed. Acad. Nat. Sci., Phila., 1866. *Systoma* do. Journ. A. N. Sci., 1867, 194.) which is found in Costa Rica. Keferstein well separates this species from *Systoma* on account of its clavculus, though it is not certain that it is not *Copea* Steindachner. In an essay on Costa Rican Batrachia this author enumerates eight species. Of these it may be remarked that *Bufo sternosignatus* Günther has been described by an older author under a prior name. *Oedipina uniformis* Kef. is an interesting Plethodont salamander, apparently the same as the *Opheobatrachus vermicularis* of Gray. No generic characters are given which are not possessed by species of *Oedipus*. I may mention here that I have hitherto regarded the latter genus as identical with *Geotriton*, and no author has presented characters by which to distinguish them. I find, however, that the European genus possesses two premaxillaries, the American one ; on this ground they may be separated. In the same way *Spelerpes pophyriticus* (vel *salmoneus*) has two premaxillaries, and all the *Spelerpes* proper but one. I therefore refer the first to a new genus under the name of *Gyrinophilus*.

RANULA AFFINIS, Peters, Cope.

This species is extensively distributed. We have it from Pebas, Ecuador, Coban Guatemala, and the Rio Verde, Tehuantepec, Mexico. Günther, after examination of this frog, says (Zoological Record, 1868,) that it is "Hyloid," an expression we fail to comprehend, as he certainly cannot mean that it bears any relationship to *Hyla*.

The digital relations, if such they can be called, are not larger than in the *Rana sylvatica*, which has just passed its metamorphoses. It is in fact most closely allied to the group of *Rana* to which *R. temporaria* belongs, as already perceived by Peters, who calls it *affinis* on this account. Like it, it possesses a dorso-lateral dermal fold, as is common in *Hylorana*.

Steindachner proposes to unite *Hylorana* and *Polypedates*. On this Günther remarks that this herpetologist could not have devoted much study to them, as they differ in the presence and absence of this dorso-lateral dermal fold respectively. Günther's criticism, however, like most of those which he too frequently directs at the labors of his fellow-students, is really applicable to himself.

So far as the "Catalogue of Batrachia Salientia in the British Museum" is concerned, no characters to distinguish them can be found. But I pointed out, some years ago, that the difference consisted mainly in the structures of the distal phalanges characteristic of each : also that *Hylorana* is much nearer to *Rana*, and is only to be distinguished from it generically, without the interposition of any possible form which would not unite them. The T-shaped phalange in some *Hyloranae* is so weak, while the expansion of the tip of the same in *Rana temporaria* and others, is so distinct, as to render the permanent distinction of the two genera a mere matter of future discovery.

LIMNOMEDUSA MACROGLOSSA, D. B.

Having had an opportunity of examining the sternum of this species for the first time, I find that it possesses the styloid xiphisternum which I have indicated as characteristic of the typical group *Cystignathi* of the family *Cystignathidae*, and it must therefore be referred to the neighborhood of *Cystignathus*. Besides other points, *Limnomedusa*, Cope, is distinguished from *Cystignathus* by the vertical pupil.

Keferstein states that I erroneously ascribe an osseous stylus of the xiphisternum to the genus *Borborocaetes* Bell. The facts are as follows : This genus was distributed by Günther in the Catal. Bat. Sal. Brit. Mus. in two widely different groups, *Cystignathus*, and one he called *Limnodynastes*. I first pointed out* that this series of species differed radically from *Cystignathus* and its allies, in the *scutiform cartilaginous* xiphisternum, and also in the large cranial frontanelle.

Up to that time the Australian species called *Limnodynastes* had never been received other than specific characters, as that by which it was stated by Günther to differ from *Cystignathus*, viz., the transverse extension of the series of vomerine teeth, is one included in the range of many well-known genera, as *Rana*, *Lithodytes*, and *Cystignathus* itself. The South American species named by Bell long previously, *Borborocaetes*, differ only from those of Australia in the shortening of these series, and not more than *Cystignathus taeniatus* does from *C. albilabris*.

GOMPHOBATES BILIGONIGERUS, Cope.

Gomphobates notatus, Reinhd. and Lütken, Vid. Medd. Copenhagen, 1861, 33 Tab. IV, f. 3. *Liuperus biligonigerus*, Cope, Proc. Ac. N. Sci., Phila., 1860, 517. Uruguay.

EUSOPHUS NEBULOSUS Cope, *Cystignathus nebulosus* Girard. It is probable that the *Cystignathid* described by Günther, P. Z. S., Lond., 1868, 482, as *Cacotus maculatus*, is a variety of this species. It agrees in all respects except in having a black suborbital spot, and line on the canthus rostralis, which Girard's types do not exhibit. Günther places it among his *Bombinatorina*. It is scarcely necessary to observe that it has not the least affinity to *Bombinator*.

* Nat. Hist., Review 1865.

APPENDIX.

ZONURUS TROPIDOSTERNUM, Cope, *sp. nov.*

Char. Scales $\frac{1}{4}$ =16, lateral ventral, pectoral and gular keeled, the dorsal keeled and very rugose. Caudal scales trihedral spine-like. Internasal reaching rostral. Dark-brown, yellow below.

Descr. This species belongs to the typical group and is near the *Z. griseus* of the Cape, but differs in many characters. The rostral is in contact with the internasal, which is much longer than wide, and of course separates entirely the supranasals. It is well separated from the frontal by the frontonasals. The other head plates are similar, except that there are six rows of temporals, the longest seven deep; those of the *Z. griseus* are much larger, including the two marginal auriculars, which are rudimental in the new species. All the plates of the head are excessively rugose, with longitudinal striae. Upper labials six, the fifth not more elevated than the others; inferiors, six; infra-labials, five; all in contact, and without larger scales within them. Gular scales in 22 series from angles of mandible; those of the neck abruptly larger, mucronate, forming a rudimental collar. Median ventrals nearly smooth, laterals mucronate keeled. No lateral fold; lateral scales increasing regularly in size from the ventrals, sub-round, widely separated from each other by minutely granular intervals, strongly mucronate keeled. Dorsal scales in 24 series from nape to opposite femur, all strongly mucronate keeled, and rugose; the median series like the others. Caudal whorls very spinous, the scales not serrate, but striate on the surface. Femoral pores, seven on each side; preanal plates small, equal, except two marginal a little longer.

Muzzle to vent	0 m 09'' 2'''	Width head...	0 m .02''
" " ear.....	04'' 4'''	Hind limb.....	" 04'' .2''
Fore limb.....	3'' 2'''	" foot.....	" 02''

Color. Below and upper lip to ear, yellow; above rich brown, with several indistinct blackish cross-shades, head above, wood brown.

Habitat. Madagascar, Mus. Essex Institute, No. 500.

EXPLANATION OF PLATES.

PLATE IX.

Claudius angustatus, Cope. Yucatan, Mus. Smithsonian, Proc. A. N. Sci., Phila., 1865. This plate with the others presented to the author by Joseph Jeanes.

PLATE X.

Cachryx defensor, Cope, Proc. A. N. S., Phila., 1866, 124. Yucatan, Mus. Smithsonian.

PLATE XI.

Laemanctus alticoronatus, Cope l. c. 124. Mus. Smithsonian, Yucatan.

TO BREVET MAJOR-GENERAL A. A. HUMPHREYS,
Chief of Engineers U. S. Army.

SIR—At a recent meeting of the American Philosophical Society it was stated by one of the members that there remained on file in the Engineer Bureau, U. S. A., several reports of explorations in the Territories of the United States, awaiting the necessary funds for publication.

The Secretaries of the Society were thereupon directed to address you on the importance of rendering the scientific parts of the reports, and more especially those relating to the geology of the regions traversed, accessible to the public, with as little delay as possible.

The American Philosophical Society, ever mindful of the object of its organization, "for promoting useful knowledge," feels particular solicitude in everything that concerns the great mineral resources of the interior of the continent, called by President Grant the strong box of the nation, and knowing that the geological explorations referred to have been made by men eminent in science, and deserving of the confidence of the community, is anxious that the results of their labor, acquired at great cost to the government, shall not be superseded, or the wise cautions contained therein rendered nugatory, by explorations conducted in the interests of private speculations.

The liberal appropriation granted by the last Congress to the geological survey of Nevada and Utah under Clarence King, Esq., has caused the Society to hope that an application for the means to publish the scientific results already obtained, and now on file, may not be without success.

In conclusion, we would add that the present communication, as directed by the Society, is intended for use, at such time and in such manner as you may think most proper for carrying out the object desired, and to aid you, so far as lies in the power of the Society, in rendering assistance, as you have heretofore done, to the great scientific and industrial interests of our country.

Signed, Charles B. Trego, E. Otis Kendall, John L. Leconte, J. P. Lesley, Secretaries American Philosophical Society.

OFFICE OF THE CHIEF OF ENGINEERS,
Washington, D. C., July 8, 1869.

GENTLEMEN—Your letter of the 26th ultimo, respecting the publication of Reports of Explorations, affords me great satisfaction, since it informs me of the powerful aid of the American Philosophical Society in securing authority to complete some of the chief objects of the explorations of our Territories by disseminating the information obtained as to their resources and the means for their development.

It gives me pleasure to state that the Secretary of War has sanctioned the publication of the Report on Geology, by Dr. Hayden, in connection with the exploration of the Yellowstone and Missouri rivers, and that it is now in the hands of the printer, and will soon be ready for distribution.

The results of Mr. Clarence King's surveys in Utah and Nevada, will be published as soon as they are prepared, Congress having made provision for it. The Report of Captain, now Brevet Brig. Gen. J. H. Simpson, has not been printed. It is hoped, however, that authority for the publication of the scientific portions at least will be given, and to this end your letter will afford valuable aid.

There are no other reports of explorations on the files of this office.

Cordially thanking the Society for its support, I have the honor to be, very respectfully, your obedient servant,

A. A. HUMPHREYS,
Brig. Gen. and Chief Engineer.

SYNOPSIS OF THE EXTINCT MAMMALIA OF THE CAVE FORMATIONS IN THE UNITED STATES, WITH OBSERVATIONS ON SOME MYRIAPODA FOUND IN AND NEAR THE SAME, AND ON SOME EXTINCT MAMMALS OF THE CAVES OF ANGUILLA, W. I., AND OF OTHER LOCALITIES.

By EDWARD D. COPE.

The following list is published in consequence of the discovery by the writer of a number of species of Mammalia in a cave breccia in Virginia. As the number of species previously described as having been found in similar situations is but small, they have been added. I have not inserted the extra-cave species of the beds known as Champlain, since it is not certain that they represent parts of the same fauna, though it is highly probable that they do. The coexistence of a number of species apparently still living on our territory, with some restricted to South America, and with others entirely extinct, is a point of considerable interest. The cotemporaneity of man with the Mastodon on this continent is not a matter of doubt*; and the coexistence of the Mastodon and recent peccary *D. torquatus*, and the extinct *D. compressus* is equally certain. These species were cotemporaneous at Galena, with a fauna quite similar to that which I found in Virginia.

The cave breccia consists, in the localities where examined by me, of a number of irregular masses, occupying depressions and short galleries, in the southeast side of a line of hills in Wythe County, Virginia. When these masses are excavated from their beds the floor and roof of a portion of a cave is exposed, with the stalactites, stalagmites, and usual incrustations. Sometimes the termini of the masses could not be reached, and they wound about between large blocks of limestone which once, no doubt, had lain on the floor of a subterranean chamber.

The teeth and bones were discovered at three different points; two of them near together, on the property of Abraham Painter, and the third about three miles on the same side of the same ridge. The Kanawha (New) River cuts the hill at the latter point, and on the side of a bluff the cavity occurred, containing *Castor*, *Dicotyles*, etc. On the other side of the same ridge, three miles further in the same direction, I examined several similar cavities of breccia, but could find no organic remains, while Abraham Painter, an old resident and careful observer, informed me that the deposit could be found on the hill side, in continuation of those on his property, for a distance of two miles in the opposite direction.

The limestone of this ridge abounds in the Carbonates of Lead and Zinc, and there can be little doubt that they predispose the rock to easy decomposition. It is also probable that, as Lesley shows, the decomposition has been followed by the successive deposit, as a precipitate of the more insoluble Silicates of those metals. This is rendered highly probable by the mode in which the silicates occur with reference to the carbonates. While the latter are distributed through the limestone rock

* See Ledy, Nott and Gliddon *Indigenous Races of the Earth*, p. xviii.

in place, the former occupy irregular pockets, caverns and veins. They occur as incrustations, sometimes tubular and of singular tenuity, as well as in masses.

The breccia caverns no doubt had their origin in the same way. The ready decomposition of the limestone has permitted them to be rapidly formed and filled again.

It is interesting to note that the only similar bone deposits occur in the galena bearing Hill Limestone of Illinois. These have been described by Drs. Leconte and Leidy, and their species are included in the present list.

MEGALONYX JEFFERSONII Harlan. Fragments of teeth. Found also in caves in Tennessee, Georgia and Alabama.

STEREODECTES TORTUS, Cope, *gen. et. sp. nov.*

This animal is represented by a nearly perfect upper incisor tooth, and fragments of numerous others. It appears to be a rodent, and the tooth in question presents several points of resemblance to that of *Arctomys monax*, from which it does not differ much in size. The characters which determine its distinction from that genus are very important, and indicate widely different affinities. The central pulp cavity is exceedingly small, and the tooth for a length no doubt considerably above that of the *A. monax*, solid, with that exception. At the distal fractured extremity it is narrowly linear in the plane of compression of the tooth, while at the proximal fracture it is round, and of perhaps a shade greater diameter. The anterior face of the tooth is as usual, covered with an enamel layer about as thick as that in *Arctomys*, which extends round the outer face, covering its anterior two-fifths, and is very slightly decurved on the inner plane face. Viewed from the centre of the arc which the tooth describes, the shaft is seen to form a slight sigmoid. The posterior narrowed margin forms a still stronger sigmoid, throwing the extremities of the shaft in opposite directions. I have not observed this torsion in any living genus of Rodentia, except in abnormal specimens.

The specific characters are as follows: A section of the shaft is a nearly isosceles spherical triangle. Distally the inner face is more nearly plane than the outer, while proximally the outer is the less oblique of the two. The anterior face is convex in section, and regularly continuous to the outer side. There is a slight groove below the edge of the enamel on the inner side, and a few weak transverse indications across the shank. The enamel is nearly smooth, under the microscope displaying weak, minute striae, much as in *Arctomys*. The arc in profile is a perfectly regular segment of a circle. The color is white, and this in a matrix where the yellow color of incisors of other Rodentia is well preserved.

	Lines.
Length of chord between outer circumference at fractured ends.....	16.
Long diameter proximal end.....	2.8
Short " " ".....	1.8

I am unable to throw much light on the affinities of the animal which

bore these teeth. They are more compressed than in the Beaver, and deeper than in the *Vischaca*; they are not so narrowed anteriorly as in the agutis. The solidity is only approached by the *Castorides ohioensis*, and to some degree *Amblyrhiza inundata*, of the same period.

CASTOR FIBER, *Linn.* *C. Canadensis*, *Kuhl.*

Portion of mandible with three molars, not distinguishable from recent specimens.

NEOTOMA MAGISTER, *Baird.* Mammals of North America, p. , tab.

Said to be larger, and otherwise different from the following. Found in the Bone Caves near Carlisle, in the great Appalachian Valley, in Pennsylvania.

NEOTOMA ?FLORIDANUM, *Say. et. Ord.*

A superior molar, incisors, and other portions. The first is not larger than in recent animals, and does not conform in peculiarities to those ascribed by Baird to his *N. magister* from the Pennsylvania Bone Caves. The latter is, however, described from mandibular pieces.

The recent *Neotoma* of this species is exceedingly common in all of the caves which I examined. Their marks can be found from near the mouths to the most remote recesses. They build, in dry places in the more distant chambers, nests of complete and durable construction. In such a chamber in the Hoge's Cave, Montgomery County, Va., I found a number of these nests near together and fastened by interwoven sticks and corn-husks in some mass, to the points and crevices of the rocks. The upper surface of the pile, in which the nest was made, was composed apparently of chewed linden bark, forming a soft, tough, and nearly white material. This surface was always oblique, and enclosed a round cavity, large enough to hold one's two fists, which was entered by a mouth a little more contracted than the whole diameter. Numerous fresh seeds of the *Celtis pumila* lay about them. They are sweet, and the small tree which produces them is abundant where the traces of the cave were found. Seeds undistinguishable from these are abundant in the limestone breccia with the remains of *Neotoma*, and testify to the identity of habit of this species in the days of *Tapirs*, *Peccaries* and *Sloths*.

ARCTOMYS MONAX, *Gmel.* The Ground Hog. One nearly perfect ramus mandibuli with all teeth but the last molar, not distinguishable from recent examples.

Found also at Galena. (See Leidy, Trans. Amer. Phil. Soc., XI., p. 100.)

ARVICOLA, *Sp.* Noted by Leidy, l. c., from Galena, Ill.

GEOMYS BURSARIUS. Leidy, l. c., p. 100.

Found at Galena by Dr. E. D. Kittoe with numerous other species enumerated by Leconte and Leidy.

HESPEROMYS ?LEUCOPUS, *Raf.*

Molar teeth undistinguishable from those of this common mouse.

TAMIAS LAEVIDENS, Cope, sp. nov.

This ground squirrel is indicated by the distal half of a mandibular ramus, with adjacent fragments, probably of maxillary and squamosal. The successional first molar appears above the alveolar border, and another tooth apparently is in place, but so encrusted with calcite, as to be quite obscured.

This species differs in three marked peculiarities from the *T. striatus*. The first molar has two anterior cusps instead of one; they are separated by a deep groove; there is also a little cusp between the external two. The incisor teeth are not striate grooved on their anterior face, as in *T. striatus*, though they have three narrow grooves on the outer longitudinal angle; they are wax yellow anteriorly. Third, the ramus is more slender, especially in the portion anterior to the molars; the depth at the mental foramen is just half the length between the first molar and the base of the incisor above. As in *T. striatus*, this foramen is nearer the superior outline of the ramus. There is less curvature visible in the inferior face than in some individuals of the existing species.

	Lines.
Length ramus anterior to m. 1.....	2.6
Depth at mental foramen.....	1.4
“ “ first tooth	1.7
Diameter incisor.....	1.
Depth at m. 4.....	2.2

SCIURUS PANOLIUS, Cope, sp. nov.

A small squirrel of the size of the Chipmunk (*Tamias striatus*), but of the type of dentition and form of the *Sciurus hudsonius*. It is represented by a ramus mandibuli, containing two molar teeth, and the included portion of the incisor, the coronoid, and vertical ramus being lost. Numerous fragments, including incisors, etc., are probably to be referred to this species.

The ramus is quite flat, being perfectly plane on the inner face, below the molars; its diameter below the first is equal to that at the incisive alveolar margin above. The series of molars is very little oblique to the plane of the ramus, and, judging by the positions of the anterior three, not curved. There is, therefore, but a slight projection of the alveolar border on the inner face of the ramus. The least depth of the edentulous portion, equals the chord from the base of the first molar to the edge of incisive alveolus. The mental foramen is near the middle of this length, and a little above the middle of its depth. The anterior margin of the masseteric fossa, is below the posterior third of the first molar.

The two molars are well worn, the first being successional: the animal was therefore adult. The worn faces are concave; the inner anterior point of the margin is the most elevated, while the two external lobes are in both the most prominent. There is also a slight emargination on the inner face. The first molar is about as long as wide, the second a little wider than long, and slightly oblique forwards and inwards; the inner

and outer lateral margins in each are about equal. In profile the first is slightly the more elevated of the two.

Measurements.

	Lines.
Length of ramus from maxillary foramen to incisive alveolus above.....	5.35
Length of bases of two anterior molars.....	1.39
“ from base of m. 1 to do. of incisor.....	1.7
“ “ mental foramen to base of incisor.....	1.55
Least depth ramus (near mental foramen).....	2.
Depth ramus at first tooth.....	2.6
“ “ third “	2.4
Width “ second“	1.2

These indicate a much stouter form than in the *Tamias striatus*.* The foramen mentale is lower in position; the series of molars is much less oblique to the axis of the ramus than in the chipmunk, and the incisor tooth is stouter. As compared with the *S. hudsonius* the measurements are absolutely one third greater, indicating a difference in size of nearly two to one. Viewed from above the thickness of the ramus at the middle in *Sc. panolius* is proportionately very much less, while at the incisive margin there is less difference; the two measurements being equal in *S. panolius*, the incisive much narrower in *Sc. hudsonius*. The first molar in the existing species is narrower outside than inside and simple; in *Sc. panolius*, equal and emarginate.

This little species has not furnished sufficient materials to indicate its relationships fully; but it is smaller than any true squirrel now inhabiting the United States.

LEPUS SYLVATICUS, Bachm.

Numerous molar and incisor teeth from both jaws, and two partially broken rami of the mandible. One of these is broken off behind the third molar; another complete only as far as the usual line of the coronoid process, and containing the second, third and fourth molars. These portions are similar to those of the common species now found throughout the eastern district of North America. Also from Galena; see Leidy l. c. XI, p. 100.

ANOMODON SNYDERI, Leconte. Amer. Journ. Sci., 1848, 103. Journ. Ac. Nat. Sci., Phil., III, 171, Tab.

A large and remarkable insectivore known only as yet from an incisor tooth from Galena.

BLARINA, sp.

A nearly complete ramus with dentition perfect, of about the size of that of the common *B. talpoides* was found, but unfortunately mislaid.

* See Baird, U. S. Pac. R. R. Expl. VIII, Tab. XLVI, 2 and 1.

VESPERTILIO, sp.

Numerous bones of bats occur in the breccia. A portion of maxillary with teeth was preserved, but fractured in the attempt to expose it.

TAPIRUS HAYSII, Leidy.

Several inferior maxillary molars. They all have a rather greater anteroposterior diameter than those of the existing Central and South American species.

EQUUS ? COMPLICATUS, Leidy. E. americanus, Leidy.

Upper and lower milk and permanent molars.

DICOTYLES NASUTUS, Leidy. Proceed. Acad. Nat. Sci., Philada., 1868, Several molar and canine teeth.

DICOTYLES COMPRESSUS, Leconte. Platygonus compressus, Lec., etc. Amer. Journ. Sci., 1848, 102. *Dicotyles, Leidy, Trans. Am. Soc., XI, p. 97, also X, 324.*

Not found by me in Virginia; abundant at Galena and elsewhere.

CARIACUS VIRGINIANUS, Gray. Cervus, Bodd.

Molars and other fragments of this species are perhaps the most abundant in the breccia. One posterior portion of ramus mandibuli with tooth in situ is in the collection.

BOS ? ANTIQUUS. Bison, Leidy.

Molar teeth.

URSUS AMPLIDENS, Leidy. Proceed. Acad. Nat. Sci., 1853.

A single posterior lower molar of this species, identical with that described by Leidy from a ravine near Natchez.

URSUS AMERICANUS, Linn. Leidy, Journ. Ac. Nat. Sci., Phila., III, 169.

From various caves; not found by me in Virginia.

PROCYON PRISCUS, Leconte. Leidy, Journ. Acad. Nat. Sci., III, 169.

Perhaps the same as the next. From Galena.

PROCYON LOTOR, Linn.

A posterior inferior molar, not distinguishable in any point from a specimen from a New Jersey peat swamp, both identical with the common raccoon.

MIXOPHAGUS SPELAEUS.

This animal is represented by a molar tooth, which though somewhat imperfect is so characteristic as to require notice. It appears to have been derived from the lower jaw from the behind position of the sectorial. It resembles the tubercular sectorial of the bear, but is even less acutely tuberculate, and is a little smaller than the same tooth in the raccoon. The surface of the crown exhibits concavities between small pointed cusps. The outer margin is a low ridge of four cusps. In front it rises into a more elevated cusp. Here also the tooth is wider, and presents a wider plane of the crown. Part of the inner margin is here broken away, but a little behind its middle a stronger cusp rises, one-third of the width

within the inner margin. The posterior margin is slightly elevated, and in front of it is another very small cusp, similar to those on the external margin.

The characters are less carnivorous than those in *Ursus*, and approach remotely the smoothness of *Cercoleptes*. There are indications of two roots, one of which is broken away. The arc of the base of the crown determines the position of this one, and of the anterior margin of the tooth. The strong anterior tubercle is slightly transverse, and the anterior face near its crest being preserved, indicates the extremity of the crown to have been but little beyond. Hence the following measurements:

	Lines.
Length to crest of transverse tubercle.....	3.7
Width at median outer tubercle.....	2.5
Depth crown between roots.....	1.8
Width of root.....	1.6

GALERA PERDICIDA, * *Cope, sp. nov.*

This is a small carnivore of the Lutrine group of the Mustelidae, apparently allied to *Mephitis* and *Lutra*. It is only represented by a left ramus of the mandible, with dentition complete. Its characters are as follows: Dentition $\frac{2}{3}$, $\frac{2}{1}$, $\frac{2}{3}$, $\frac{2}{2}$. The tubercular molar is relatively as in the allied genera, but without sharp tubercle; the sectorial characterizes the genus as distinct from the two mentioned. The posterior lobe is without the marked internal and external acute tubercle seen in *Mephitis*, nor the tubercular crest of *Lutra*, but is rounded and slightly concave. The median crests, inner and outer, are strongly developed, and with the anterior, quite as in *Mephitis*.

The jaw pertained to an adult individual of smaller size than the common skunk, *Mephitis chinga*. The bases of the crowns of the first and second premolars, and to the outer side of the canine are surrounded by a well marked cingulum. The length of the crown of the molar is greater in proportion to the length than in the skunk. The axis of the coronoid process is as in it, at right angles to that of the ramus. The latter is straighter on the inferior border than in the skunk, and exhibits a marked difference in the angle being nearly on the same line, and not raised above it, as in the species of American skunks and otters, figured by Baird.

Measurements.

	Lines.
From angle to outer incisive alveolus.....	15.6
Depth at coronoid.....	8.
From base condyle to tubercular molar.....	5.
Length sectorial molar.....	3.6
Width " ".....	1.2
Height from basal shoulder.....	2.
Depth ramus at tubercular.....	2.7
" " at pm. 2.....	3.1
Length of crown of canine.....	3.

*The pedant would write this *perdicicida*.

There are two mental foramina in the specimen, one below the third, the other below the first premaxillary. The crown of the canine is contracted and curved; slightly flattened on the inner side.

Recapitulation.

Whole number of species.....	27
Number extinct.....	14
Genera extinct.....	5
“ of neotropical type.....	6

Helices are extremely abundant in the matrix, with a few other molluscs. They have been identified for me by my friend, Geo. W. Tryon, as follows:—

Mesodon dentiferus, Binney.

“ *major*, Binn.

“ *albolabris*, Say.

Xolotrema appressa, Say.

Xolotrema palliata, Say.

Stenotrema sp. near *hirsuta*.

Anculotus carinatus.

Associated were numerous vertebræ of *Crotalus* and perhaps *Tropidonotus*, fragments of *Trionyx* and *Cistudo*, and *Menopoma*. Also fragments of a *Unio*, and the ungual phalange of a bird of prey. There were no human remains of any kind discovered in the breccia.

A collection of fossils of similar character to the preceding, was obtained by Dr. Samuel Harrison of Easton, Talbot co., Maryland, and is preserved in the cabinet of the Baltimore Academy of Natural Sciences. The specimens were exhumed in the course of excavating for marl on the farm of Lambert Kirby, in Oxford Neck, Talbot County. They consist of a considerable number of fragments of the *Elephas americanus*, Leidy, with two molars, the tusks, and maxillary, premaxillary and parts of frontal bones. Fragments including parts of antlers, not distinguishable from *Cervus canadensis*, and *Cariacus virginianus*; the humerus of a *Chelydra* not distinguishable from that of *C. serpentina* and of the largest size the species is known to attain; and a portion of the margin with posterior costal and vertebral bone of *Cistudo eurypygia* Cope, sp. nov. A molar tooth accompanied the above, which resembles that of the half grown *Elephas primigenius* or *E. columbi*, but has not the lateral curvature of the latter.

In the earth on the floors of the caves which abound in the lime-stone region of South Western Virginia, the remains of the existing Mammalia of the country may always be found. I have procured *Lynx*, *Vulpes*, *Procyon*, *Cariacus*, *Didelphys*, etc. In one chamber the fresh food, apparently of a raccoon, was found, consisting of fresh hazel nuts, wild plum, choke cherry, chicken grapes, acorn, etc. In many, human remains occur, with beads, needles of bone, etc.

In Erhardt's Cave, Montgomery County, Virginia, the writer found four or five specimens of a new *Anophthalmus*, the *A. pusio* of Horn, at a

distance of not more than three hundred feet from its mouth. The species is small, and all were found together under a stone. Their movements were slow, in considerable contrast to the activity of ordinary Carabidæ.

Myriapoda are the only articulates which can be readily found in the remote regions of the caves, and they are not very common in a living state. I append a list of these, with their congeners of the outer world, which I collected in the mountainous region. Many of them have been kindly named for one by my friend Dr. H. C. Wood, the author of the Monograph on the American species.

SCOLOPENDRIDÆ.

OPISTHEMEGA POSTICA, Wood, Journ. Acad. Nat. Sci.

This species, or a variety of it with the posterior pair of limbs considerably stouter than the specimens from North Carolina, described and figured by Wood, is one of the most abundant species in the mountains of southwestern Virginia. It occurs every where under stones, etc., and is very active. Its great peculiarity is the modification of the posterior pair of limbs into a pair of stout jaw-like members, which like the anterior jaws are used in offence and defense. They seize the finger with them easily, and penetrate the skin with their sharp chitinous points, though not as effectively as with the jaws. Thus armed at both extremities, they are even less pleasantly handled than the Scolopocryptops *se xsp in o s a*, which is also common in the same country. An undescribed Scolopocryptops, with a green body and reddish head, is also common.

LYSIOPETALIDÆ. Wood, *defn.*

The genera of this family appear to the writer to be two, defined as follows :

Annuli without pores.

SPIROSTREPHON.

Annuli with two pores on each side the median line.

PSEUDOTREMIA G. N.

SPIROSTREPHON LACTARIUS, Brandt, Wood Monograph Myriapoda N. A., 192, *Julis lactarius*, Say.

Not uncommon.

PSEUDOTREMIA CAVERNARUM, Cope, *sp. nov.*

This animal inhabits the deepest recesses of the numerous caves which abound in Southern Virginia, as far as human steps can penetrate. I have not seen it near their mouths, though its eyes are not undeveloped, or smaller than those of many living in the forest. Judging from its remains, which one finds under stones, it is an abundant species, though rarely seen by the dim light of a candle even after considerable search. Five specimens only were procured from about a dozen caves.

Segments twenty-nine, without dorsal keel or groove, but quite convex in antero-posterior section, and somewhat swollen at a dorso-lateral point, forming a slight shoulder and slightly quadrate transverse section. The shoulder becomes much stronger on a few anterior segments. Surface of the annulus rugose, above most so on the shoulders; laterally to the legs

longitudinally (with the axis) coarsely many striate. Posterior annuli but slightly compressed, the last unarmed. Diameter of anterior segments rapidly decreasing to the head. Lateral pores not distinct on anterior segments. An impressed line crosses the latter at the inner lateral pore. Basilar segment smooth, not emarginate in front. Front sparsely hairy; lateral region rather prolonged, openly emarginate. The antennæ as in the other known American species of this family, are elongate and hairy, the relative lengths of the joints being: third longest, 3, 5, 4, 2, 7, 8, 1. Eyes in well developed triangular patches in depressions behind the antennæ.

Length 11 lines; diameter 1.1 line; segments of specimens of considerably larger size, while two taken in copulâ were rather smaller. Color varying from a nearly white to a pale red.

Taken in Erhart's Cave, Montgomery Co., and Spruce Run and Big Stony Creek caves, in Giles Co.

PSEUDOTREMA VUDII, Cope, *sp. nov.*

This species differs much from the last, and resembles rather *P. caesioannulatus* of Wood. The points separating it from the latter will be pointed out below.

Number of segments same as in the *B. cavernarum*, twenty-nine, but they are neither convex nor rugose nor coarsely striate, but marked with a very minute, irregular longitudinal striation. Segments cylindric, without shoulder, but with a small point directed backwards on the posterior margin of the lower part of the annulus, which is enlarged on the front segments. This elevation is furnished on the anterior and posterior regions, and probably everywhere, in an uninjured condition, with a bristle. On the anterior segments a hair in front of each pore. Front plane, with finer and coarser hairs sparsely distributed. Labral margin with an open notch. Antennæ hairy, with a bristle at the distal extremity of each joint. Lengths, 3rd, 5th, 4th, 2nd, 8th, 7th, 1st; the eighth joint longer than in *A. cavernarum*. Eye patch triangular, not in a depression. Posterior segments considerably compressed, the last scutum with four transparent marginal bristles; extremity of body slightly recurved. Total length, eleven lines.

Color pinkish-brown, with a pale band from below to the external pore on each side of each annulus. Top of head black.

A single specimen, the exact locality not preserved, but probably Montgomery Co., and, I think, not from a cave. I have conferred on it the name of my friend Dr. H. C. Wood, Jr., to whom we are indebted for a system of the Myriapoda, and the means of studying the American species. It differs from the *A. caesioannulatus* of his monograph, in the rounded dorsum without keel or groove, the 29 instead of 32 segments, and the coloration. The eye patches are not in a depression, nor is the labrum deeply emarginate, as Wood describes.

JULIDAE.

SPIROBOLUS AGILIS, *Cope, sp. nov.*

This is the pigmy of the genus, and is not less distinguished by the small number of its segments, and the greater activity of its movements. The short antennae, and anteriorly produced second segment, are precisely those of other species of the genus.

Segments thirty-eight, smooth above, but with delicate, irregular longitudinal striae below. Front higher than wide, smooth, not punctate, but with a faint trace of median groove. Two rows of hairs on and above the labral margin. Bristles of the legs weak. Preanal plate transverse narrow elliptic. Antennae sparsely hairy. Total length, eight lines. Color, wood-brown, with a reddish posterior marginal band to each segment; front and antennae pink.

Giles County, Va.

CAMBALA ANNULATA Cope, *Julus annulatus* Say, J. A. N. S., 1st, II., 103. *Spirostrephon* Newport, Wood. ? "*Julus lactarius* Say" Gray et Newport not of Say. *Cambala lactaria* Gray and Newport.

Gervais and Wood have pointed out the error of Gray and Newport in regarding this animal as the the *J. lactarius* Say, but have not suspected that it is the *J. annulatus* of the same author. The species is quite rare, as I have seen but one specimen, which I took in the Spruce Run Cave on the Kanawha River, in Giles Co., Va. It has considerable superficial resemblance to the *Spirostrephon lactarius*, and is one of our most elegant Myrapoda. In generic characters it has the second annulus of *Julus*, and the short thick antennae of *Spirobolus*, but adds a speciality in the almost obliteration of the visual organs. These are reduced to a single linear series of not very distinct ocelli immediately adjoining the margin of the basilar segment on each side.

Segments sixty-one; color deep mahogany brown above. Total length 2 in. 2 lin.

Say's description applies exactly to our specimen. It would not be safe to insist that this is the *Cambala lactaria* of Newport, but it most probably belongs to the same genus, characterized by linear eye-patches.

JULUS MONTANUS, *Cope, sp. nov.*

This species is in most respects similar to the *J. pennsylvanicus* as given by Wood. There are two impressions on the vertex; the antennae are elongate; the last scutum is prolonged into a moderate straight mucro, and the posterior segments are quite pilose. The color is a dark brown with a series of blackish dots on each side. It differs from *J. pennsylvanicus* solely, so far as can be ascertained, in having 69 instead of 63 segments, and in the median portions of the same being smooth, and the inferior portions closely many grooved, instead of having "above punctae which give rise to obsolete grooves," Wood.

Mountains of Giles and Montgomery Counties.

POLYDESMIDÆ, Latr.

POLYDESMUS VIRGINICUS.

POLYDESMUS CORRUGATUS, *Wood.*

ANDROGNATHIDÆ, *Fam. nov.*

A group intermediate between the suborders Strongylia and Sugentia. Characters. The labium a broad slightly cordate plate, extending beneath the consolidated elements of the front, and having a slight membranous marginal attachment externally, leaving a small oval orifice at the anterior extremity. The mandibles rudimental, extremely minute, far within the margin of the inferior face of the head, composed apparently of two segments. Segments of the body consolidated. Preanal segment an uninterrupted cylinder.

ANDROGNATHUS, * *Cope, genus novum.*

Char.—Joints of the antennae five, the sixth and seventh confluent, and with the closely joined fifth, forming a club, supported by the short proximal joints; segments of the body numerous, (over fifty in the only species,) muzzle short.

This singular genus is one of the hitherto unknown forms connecting the suctorial group of Myriapoda with the mandibulate. It furnishes a clue also to the structure of the suctorial mouth of the former group, which appears to have been as yet unexplained. Thus we see that the mandibles disappear, and the labium extends, and uniting by its margins on either side leaves the mouth a transverse fissure. With a further union of the mandibles with a prolonged labrum on each side, we would have a form of Sugentia, perhaps like *Brachycybe* of Wood, between which and the *Polydesmidae* the present genus stands. Like many of the members of the latter family, this one occurs under bark of decaying logs, though its food is more probably of a soft character, as the decomposing fungi often found in such situations or the bodies of dead insects and molluscs.

ANDROGNATHUS CORTICARIUS, *Cope, sp. nov.*

This is a rather slender and cylindric species with fifty-six segments, having rather short, strong, lateral laminae projecting abruptly from all except the anal. The dorsal portion of the segment is convex above the lamina, but less so than the ventral. The anterior laminae are transverse but the majority have an oblique anterior truncation. Non sheathing part of each segment slightly convex, and divided on the median line by a groove, within which runs a delicate thread or bead, which is raised on the lower part of the segment, and extends throughout the length. Upper surface of segment also divided transversely by one annular groove, the raised portions being minutely rugose. The same rugosity exists below the laminae. The anterior shields and laminae at least, have a fine pubescence. The antennae and front are densely pubescent. Labral margin flat, not emarginate. The muzzle is not so long as the antennae, and less contracted than in Wood's figure of *Brachycybe*. Anal annulus elongate, smooth, truncate, enclosing the short lateral anal plates. Length nine lines; proportions slender. Color in life, a very pale yellowish brown, lighter below.

From Montgomery County, Virginia.

* *ανηρ* man, *γναθος* jaw.

II. Description of two large extinct rodents from Anguilla, West Indies, with remains of human art associated.

AMBLYRHIZA, Cope.

Molars curved prismatic, rootless, some composed of four, others of five dentinal columns, separated by more or less transverse plane laminae of enamel; the whole enclosed in a sheath of cementum. The fangs contracted, closing one or more of the dentinal columns at the base. Triturating surfaces plane, subquadrate, or subtrigonal. Incisors narrow, with very small pulp cavity for much of the length; anterior plane transverse, the enamel equally folded in a narrow band on the inner and outer faces. Digits subungulate.

The characters of the genus ally these animals to the Chinchillae, and do not present more than a small number of differences, though important ones. Thus the closure of the dentinal columns below, indicates either a limit to the formation and protrusion of teeth of the same degree of complication, or the entire termination of such process, as in the root bearing types. It presents in fact an interesting transition between the monophyodont and diphyodont structures. There are two extinct genera related to the Chinchillae, with which the present may be compared; *Archaeomys* Laiz. Par. and *Megamys* D'orb. The first is said only to differ from *Lagidium* in the presence of an additional dentinal column, so that the form of the root is to be presumed to be the same; it therefore differs from *Amblyrhiza* in that respect, as well as in having the dentinal columns $\frac{4}{3}$ instead of $\frac{5}{4}$. The known species are from the fresh-water limestone of Allier, France. *Megamys patagoniensis* is only known from a tibia and rotula, and its dental characters are therefore not ascertainable. I cannot refer the present animal to that genus with any probability. The species is much larger than that described by D'orbigny.

AMBLYRHIZA INUNDATA, Cope. Proceed. Acad. Nat. Sci., Philada., 1868, p. 313.

The remains of this large rodent were found in a mass of breccia, which was thrown out in the excavations made in a cavern in the small Island of Anguilla, W. I. The remains occurring in that most eastern region of the West Indian Zoological district, might be anticipated to have a special interest in connection with the history of the submergence of a once great continent. With this impression, the writer examined a quantity of the above breccia and cave deposit, which was brought to Philadelphia as a probably available phosphatic manure. It was found to be valueless for this purpose, and the only result of the outlay was the discovery of the *Amblyrhiza*. Most of the fragments were dressed from a single block. There were in this the extremity of a right femur with patella, shafts of various long bones, fragments of pelvis and maxillary bones, with three molars, and two partially complete, and other much broken incisors. The teeth were scattered among the bones, and are so related in size to most of them, as to induce the belief that they all belong to the same animal. This is strengthened by the occurrence of the

distal portion of the right femur of another individual in another mass, and the entire absence of bones or fragments which could be referred to any other animal. In the matrix occurred *Turbo pica* L., whereby the postpliocene age of the deposit is to be inferred.

The molars belong to an animal of the average size of the *Castoroides chiensis* Foster, and as the epiphysis of the femur is not yet coössified, and the animal is young, I have no doubt, the proportions of the species are quite equal to those of the beforementioned largest of known Rodentia. This is confirmed by the proportions of the femora, whose shaft and condyles are larger than those of the ♀ *Cervus elaphus* of four years old, with which I have compared it. What the bulk may have been, is difficult to infer without additional portions of the skeleton, but it is sufficiently obvious that this ancient chinchilla exceeded the Virginian deer, and more than equalled the American Black Bear in this respect.

Three molars are preserved, two of which present four dental columns, and one three. These columns are transverse, the first, which I assume to be anterior, transverse; the second the longest, the third shortened inwardly, and slightly curved round the very small fourth, which occupies a posterior-external angle of the crown. All are separated by rather thick enamel laminae. The form of the crown of the largest presents two sides of a square anteriorly and externally, the inner side bilobed in correspondence with the two anterior columns; the posterior strongly convex backwards and outwards. The other, similar molar, differs in the posterior outline being more nearly transverse, and the anterior outlines being united by a continuous curve. The large portion of the third tooth preserved is perhaps the external; it is a part of a nearly regular transverse oval.

The first described molar is strongly curved posteriorly, and its diameter narrows regularly to the contracted base; there is a shallow groove at the junction of the anterior enamel lamina with the inner wall. This groove is much more strongly marked in the second described, but ceases before attaining the contracted extremity. The shank of the tooth is less curved than in the other. The contraction is less gradual than in the first, but is strongly marked at the base, where the pulp cavity is not wider than one of the columns.

	Lines.
Length anterior face No. 1 (on curve).....	14.3
Diameter crown (longitudinal).....	6.
" " (transverse).....	5.7
" root (longitudinal).....	4.
Length anterior face No. 2.....	14.3
Diameter shank (longitudinal).....	6.
" " (transverse).....	5.

A portion of one of the inferior incisors of some forty-six lines in length, and another shorter piece, furnish characters of the species and genus. The inner face of the tooth is plane, and at right angles to the anterior; the outer is rounded obliquely inwards; the inner face is broad and not

prolonged ; the curve of the tooth is in one plane, and the depth is about equal to the width. A narrow fold of the enamel embraces the anterior border of the inner and outer faces ; it is folded back at a right angle within and with a truncate angle without. The enamel is sculptured into numerous close, fine longitudinal grooves, which do not inosculate. The separating ridges number 14 near the middle of the tooth, those near the borders being the strongest. One, strongest of all, is on the external turn of the enamel, and near it numerous interrupted ridges have a slightly oblique direction.

The incisors are, as in the modern representatives of the *Amblyrhiza*, of more slender proportions than in the beavers, *Arctomys*, and other rodents, and their extinct predecessors. They are, also, relatively less stout than those of the *Castoroides*. Their sculpture is quite similar to that seen in the *Lagidium* and other chinchillas.

	Lines.
Width anteriorly.....	6.
Depth.....	5.7

Having requested Dr. Rijgersma to make further search in the localities where the preceding specimens were obtained, that gentleman made a special trip to Anguilla, and made a successful search among the debris and in the caves, whence the supposed phosphatic earth had been excavated. He found a considerable number of bones and five additional molars of *Amblyrhiza* ; also seven molars referred below to a distinct and allied genus (*Loxomylus* Cope) with numerous incisor teeth belonging to both genera.

Two adjacent molars of the first named, are in excellent preservation, and the posterior displays one dentinal column more than any other tooth ; it is, therefore, probably the posterior superior. They all display the curved shank and plane crown and contracted root already described. A portion of a superior incisor measures 1.35 mm. in transverse diameter, and 1.4 mm. in depth.

A distal phalange (figured) displays clearly the subungulate character of the genus, in its straight shaft and depressed, truncate extremity. It was found with a few of the teeth and other bones of this species, which are distinguished from the others by their bright red color.

On a third examination of the locality Dr. Rijgersma found some masses of breccia, in one of which is enclosed a very fine superior incisor of the left side, probably belonging to this species. Both extremities are broken off, but the remaining fragment measures 7 in. 5 lin. in length; the width of the anterior or enamel covered face is nearly eight lines, and the depth eleven lines; the latter measurement somewhat increased by the partial crushing of the shaft. The enamel exhibits the usual longitudinal ridges, but there are two stronger a little within the external margin, and another strongly marked, a quarter inch within the inner margin. This tooth indicates an animal as large as the largest known *Castoroides*, for though the incisors of some of the latter slightly exceed those of the present animal, these teeth have a larger proportion to the general bulk in *Castoroides* than in *Amblyrhiza*.

The extremity of the femur is remarkably broad and depressed ; it expands a little at the condyles. The trochlear groove is but little raised above the plane of the anterior (superior) face of the femur, while its lateral bounding ridges are strong, the inner the more prominent. The width of the groove is about equal to the transverse diameter of the tuberosity on the inner side, and greater than that of the outer. The faces of the condyles are quite inferior, and sub-depressed, the outer extending rather more posteriorly than the inner. Both are so separate from the trochlear groove as not to have had any continuous face with it; this is not entirely clear, as the surface is slightly injured at the point of connection. The inter-condyloid fossa is continuous both with the inferior face of the femur, and with the trochlear groove, without separating ridges, as many rodents exhibit. Just above the inner condyle there is a strongly marked fossa of a regularly rounded form.

The general character of the two femora confirms those of the teeth, as of a large rodent. The form and relations of the articular faces differ alike from those exhibited by Carnivores, Ungulates and Edentates. The patella, which pertains to one of the femora, is an elongate bone, with thinned and rounded distal extremity. The proximal portion is lost, but at the fracture the section is very convex. More distally it is flat.

	In.	Lin.
Width femur just above condyles.....	2	3.7
Depth " " ".....		14.
Width at tuberosities.....	3	4.8
" trochlear groove, distally.....		16.
" inner condyle.....		14.2
" outer ".....		18.
" intercondyloid fossa.....		7.
Length fragment patella.....	2	6.
Width at middle ".....		14 6
Depth at fracture.....		10.4

LOXOMYLUS, Cope.

Molars straight, prismatic, composed of three dentinal columns, one of which is incurved, but none closed at the base. The triturating surface very oblique in the vertical direction, indicating the greater elevation of the teeth at one extremity of the series than the other. A horizontal obliquity of the dentinal columns is produced by their lateral displacement. Enamel plates but slightly curved. An external cementum layer.

This genus differs in many points from *Amblyrhiza* ; these are, the lack of one and two dentinal columns ; the double obliquity of the crowns, the absence of curvature, and less closure of the base. It is nearer to *Archaeomys* Laiz. et Par., but differs in two points ; that the upper molars have but three dentinal columns like the lower, instead of four, and that the horizontal grinding surface is oblique. This last peculiarity alone seems to distinguish it from *Lagidium* and *Chinchilla*, indicating a relation to the latter similar to that between the great extinct beaver of Europe *Trogontherium cuvieri*, and the existing genus *Castor*.

LOXOMYLUS LONGIDENS, Cope.

This large rodent is represented by seven molar teeth and probably some incisors and bones of the skeleton; all except one tooth in the collection made by Dr. H. E. Van Rijgersma in the caves, and cave breccia taken from the caves in the island of Anguilla, West Indies.

I cannot distinguish the incisors as belonging to this species, and they are probably identical in character with those of the *Amblyrhiza in undata*, as is generally the case with nearly allied genera and species of Rodents.

A section of all except the terminal teeth is an oblique rhomboid, the longitudinal diameter being but little greater than the transverse. A single terminal tooth (either superior posterior or anterior inferior), is narrowed in the terminal column. All the teeth possess one longitudinal groove on one side and two on the other, which are covered but not obliterated by the cement layer. The teeth, though much straighter and more slender than those of *Amblyrhiza*, yet possess a light lateral, though no antero-posterior curvature; those of the upper and lower series curving in opposite directions.

	Inches.
Length of a median molar.....	1.7
Antero-posterior diameter (oblique).....	.52
Transverse " (both of crown).....	.43
" " terminal molar.....	.39
Longitudinal " " ".....	.56

One tooth of this species was taken from a mass containing molars and incisors of *A. in undata*, and the species is without doubt of identical age with it. Its molars indicate a less robust animal, but I find no incisors which indicate an animal of generally small size. An inferior incisor to which adheres a portion of a molar apparently of this species, is not distinguishable from that of the *A. in undata*. It measures .11 in. in length and .012 in width anteriorly. This species was probably as large as but more slender than the *Amplyrhiza*.

The Island of Anguilla could not readily have supported a fauna of which these huge rodents formed a part. Such large animals have no doubt ranged over a more extended territory. This, and other facts mentioned by Pomel, lend probability to the hypothesis of the latter author, that the submergence of the ranges connecting many of the Islands of the Antilles has taken place subsequent to Pliocene times.

Associated with the preceding remains, Dr. Rijgersma discovered a highly interesting relic of the stone age of the human inhabitants of this portion of the West Indian Islands. I use the term stone age in a chronological sense only, since the region in question possess chiefly coral rock, and little or none that is adapted for conversion into cutting instruments, so that the inhabitants resorted to the use of animal products, as teeth, bones and shells. The implement found by Dr. Rijgersma is a long ovate spoon-shaped scraper or knife, cut by human hands from the lip of the large *Strombus gigas*. The ribs of the external surface and the smooth

internal surface are easily distinguished, and the distinct natures of the lamellar and prismatic layers have been evidently well understood by the artificer, who has ground away the latter in order to put a sharp edge on the former at one end. This edge is sharp, and mainly well preserved. The implement has a greater median width, and smoothly ground thick margin; the end of the plate is obtuse and with thick edge, almost entirely composed of the prismatic layer. It has evidently been held in the hand, and been used after the manner of the stone chisels of the North American Indians.

The cotemporaneity of man with postpliocene Mammalia in Europe and North America may be considered as established. It is, however, an important question to decide whether man occupied successively regions more and more remote from a supposed place of origin by migration, or whether a cotemporary postpliocene existence can be traced over the whole earth. His remains were not found by Lund after remarkable and extensive investigations into the postpliocene cave fauna of Brazil, though human remains from caves not far from Rio Janeiro, are in the Academy's Museum. What the precise age of these is, cannot now perhaps be stated. On the Peninsula of Florida Prof. Wyman has found remains of Man, but not associated so far as I can ascertain with any extinct species of Mammalia.

The present shell-chisel was found by Rijgersma under circumstances precisely similar to those attending the discovery of the gigantic rodents. Some portions of each of the species described were embedded in the breccia, and others occurred loose in a red earth in cavities of the breccia. The chisel has the color and constitution of the latter teeth and bones, and was found with them in this earth. Some of the teeth are even more fresh looking and less stained than the chisel. Though the evidence is not quite conclusive, yet the inference is very strong that the *Amblyrhiza* and *Loxomylus* had human cotemporaries.

If now these large herbivorous animals lived before the submergence of the mountains, whose peaks the present Virgin and other West Indian Islands are, we are enabled, with due regard to the slenderness of the evidence, to suggest human co-existence with that great geological event. A probability is thus added in favor of the lateness of the period of submergence of a former Caribbean continent, as already suggested by Pomel.

III. On two extinct Marine Mammalia from the United States.

ANOPLONASSA, Cope.

This genus is represented by a considerable portion of the mandible. No other fragment has as yet come under my observation. The portion does not extend posterior to the symphysis, but the latter is very long, and the rami slender, indicating a form of muzzle quite like that of a gavial or a *Squalodon*. It is strikingly different from the latter genus in being for the most part edentulous. The foramina of the dental arteries issue numerously along the outer margin of the superior face of the ramus, and are more or less connected by a longitudinal groove. Shallow

alveoli for two representatives of teeth on each side, indicate a peculiar character of the genus. The two largest alveoli occupy the extremity of the symphysis, looking upwards and forwards. They are closely approximated, and are together wider than the mandible immediately behind them, which expands to support them. They are shallow, with rugose floor, which is somewhat elevated medially, and perforated by numerous nutritious foramina. The other alveolæ are nearly twice the middle of the mandible behind the anterior pair. They are much smaller than the latter, and equally shallow, and of a longitudinal ovate form; the fundus is rugose; not elevated, and furnished with nutritious foramina, which are smaller than those of the edentulous gum.

That true teeth occupied these positions, appears to me doubtful, from their shallowness, and small foramina. I rather suppose them to have been knobs or bosses, possibly corneous in structure. The edges of the mandible resemble those of such edentulous Cetacea as Hyperaodon and Xiphius, and indicate not very distant relationships to tooth bearing types. The mental foramina are large and subdivided, so that the largest and posterior opening is inferior, the superior anterior.

The affinities of this very curious genus appear to be in a general way with the aberrant Cetacea. The nearest types appear to be on the one hand Sirenia, and on the other, Squalodon. How remote it may be from either, it is difficult to state; of approximation to either little can be said. Should the posterior part of the ramus exhibit teeth, their character would indicate its Sirenian or Cynoroid relationships. We can now only indefinitely regard it as a shore loving Cetacean, with a long slender beak, which it must have used much as nippers, perhaps probing mud or deep cavities, but for what kind of food it is difficult to imagine.

ANOPLONASSA FORCIPATA, Cope.

The length of the portion of the mandible described is seven inches, six lines. The transverse diameter differs very little to a point half way between the alveolæ, where it is gently contracted; it is then slightly expanded, and presents an obtusely projecting outline at the extremity. In profile the symphyseal extremity curves gently upwards from the point where it first contracts, so that the ridge separating the alveolæ is quite elevated. In transverse section the fragment is almost practically an isosceles spherical triangle, with a straight superior side. The superior face is however slightly convex in section, and a little elevated above the dental grooves on each side. There is a slight groove on each side of the symphysis below, which becomes very strongly marked distally. They diverge and continue to the extremity through the mental foramina, and reaching the upper surface nearly meet again. They enclose a strong symphyseal ridge, which is distally divided by a groove.

Measurements.

	m.
Length of fragment.....	.1920
“ to second alveolus.....	.0735
“ of “ “0140
“ of first “0240

Width distally.....	.0325
“ least.....	.0270
“ proximally.....	.0320
“ of distal alveolus.....	.02
“ of second “65

This species was found with a number of rolled fragments of *Mastodon* not far from Savannah, Georgia. The specimen is silicified, is dense and heavy, and slightly worn. Its color is black, and it resembles in all respects the remains of the *Mastodon* accompanying. It is preserved in the Museum of Comparative Zoology, Cambridge, Mass, and was lent me for examination by Prof. Agassiz, the director.

HEMICAULODON, *Cope*.

This genus is established on a right upper incisor of a large Sirenian Mammal allied to the *Dugong*.

The form of the tooth is that of a compressed, slightly curved cylinder, with distal and proximal vertical diameters equal. There are two open grooves on the inner and one similar on the outer side, the former enclosing a broad bead. The transverse diameter posteriorly is less than that anteriorly. The substance of the tooth is composed of a large axis of osteo-dentine surrounded by a broad cylinder of dentine, which is in turn surrounded by a thick stratum of cementum. The dentine is marked at regular distances by annuliform ridges, which are more or less undulate. They become gradually more distant distally. These ridges can be traced through the cementum. The cementum is everywhere entire, and is thicker distally. It presents externally a few longitudinal grooves at irregular distances, and numerous fine striæ irregularly disposed.

The pulp cavity is small and compressed; how far it extends into the shaft is uncertain, as it is choked by hard debris; but at the lowest point it is much contracted and sublinear. But a portion of the triturating surface is preserved; it truncates the tooth upwards and backwards in relation to its axis, as would be anticipated in a superior incisor.

The characters of this genus ally it to *Halicore* and *Rhytidodus* Lartet. In *Trichechodon* Lankester, the dentine does not present the external transverse ribs; the same character distinguishes it from *Halitherium* Kaup; in both these genera there is a distal acumination not visible in *Hemicaulodon*. *Ontocetus* Leidy from the Miocene of North Carolina, which I suppose to be a large Sirenian allied to *Halicore*, presents very weak and approximate dentinal ridges on part of its surface. It differs from this genus in the acuminate form of the tooth, and it probably presented a conic apex as in *Trichechodon*.

The comparison with its nearest allies is as follows. Both *Halicore* and *Rhytidodus* have the upper incisors dilated and flattened distally, and with a narrow oblique triturating surface. This extremity is, according to Owen, the only portion of the tooth which is exposed beyond the gum. In the present genus no such expansion exists so far as observed, and the truncation and exposure of the tooth, takes place at a point which would correspond to the basal third of the fang in those genera. In the latter

this point is deep within the alveolus. It is therefore much shorter, even supposing its extremity to have been broken off, and worn on the fractured surface. Both the above genera possess a layer of enamel on the external, and a sheath of cementum on the internal side; in this genus there is a thick sheath of cementum all round. The plane of the worn surface is in *Halicore* oblique to the short diameter of the shaft of the tooth (see Lartet on *Rhytidodus*, Bull. de la Soc. Geol. de France, 1866, Pl. XIII), while in the present species it is oblique to the long diameter.

HEMICAULODON EFFODIENS, *Cope sp. nov.*

The transverse diameter of this tooth is greater anteriorly than posteriorly. The ribs of the dentine are strongly marked and distant. The dentinal layer is about one half the thickness of the osteodental axis, and three times that of the cementum.

	Metres.
Greatest length of specimen.....	.015 .00
“ diameter.....	.007 .40
Least “004 .50

The external surface of the cement is slightly rugose from interruptions of striæ. The widths of the tooth increase very little from the basis to the worn surface.

The only specimen of this remarkable species which I have yet seen is considerably larger than the corresponding portion of the Indian Dugong. It was first brought to notice by Dr. Samuel Lockwood, of Keyport, Monmouth co., N. J., who obtained it from the Eocene marl pits at Shark River, Monmouth co.

EXPLANATION OF THE PLATES.

PLATE III.

Fig. 1.—1 a. *Galera perdicida*, Cope.

“ 2.—2 a. *Mixophagus spelæus*, Cope, double nat. size.

“ 3.—3 a. *Sterodectes tortus*, Cope, external and posterior views of superior incisor.

Fig. 4.—*Tamias laevidens*, Cope, double nat. size.

“ 5.—*Sciurus panclius*, Cope, 5 a, right ramus of mandible from above; both double nat. size.

Fig. 6.—*Tapirus haysii*, Leidy, inferior molar; 6 a, another inferior molar, from above.

The above are of the natural size, except where stated otherwise.

PLATE IV.

Fig. 1.—1 a. *Amblyrhiza inundata*, Cope, inferior incisor; 1 a, from the outside; nat. size.

Fig. 2.—Do. molar, from behind; 2 a, crown, grinding surface, nat size.

“ 3.—Do. two posterior superior molars from the side; 3 a, grinding surface; nat size; 3 b, root of do. from behind.

Fig. 4.—Do. right femur, from above; 4 a, distal end of same, slightly restored from specimen of fig. 5. One half nat. size.

Fig. 5.—Do. right femur of second individual from the outer side; one half nat. size.

PLATE V.

Fig. 1.—Amblyrhiza inundata, distal phalange, lateral view; 1 a, anterior view.

Fig. 2.—Leptomylus longidens, Cope, two molars, lateral view; 2 a, crowns of do.

Fig. 3.—Leptomylus or Amblyrhiza, premaxillary teeth and bones from below, showing incisive foramen.

Fig. 4.—Human implement made from Strombus gigas., 4 a, lateral view.

Fig. 5.—Anoplonassa forcipata, Cope, mandible from above; a, from the side.

Fig. 6.—Hemicaulodon effodiens, Cope, incisor from the side; a, triturating surface.

Stated Meeting, August 20, 1869.

Present, four members.

JUDGE LOWRIE, in the Chair.

A letter from Prof. Coppeé announced the return of Marianna's History of Spain.

A letter from the President nominated Dr. Bell to prepare an obituary notice of Dr. Meigs, deceased.

A letter from Dr. Leidy accompanied a donation of three highly ornamented Ojibwa pipes to the Museum of the Society by Mr. Clark.

A letter from the Mayor of the XVI Arrondissement of Paris requested a donation of the Publications of the Society for a Public Library in that precinct.

Letters of acknowledgment were received from the Society at Moscow, April, 1869, for Proceedings No. 77; the Vienna Academy, XIII. ii. 73-77; Society at Rome, 77; at Bordeaux, March 12, 76, 77; Lisbon Academy, March 28, 1868, List. Catalogue, I.; B. N. H. S., 78, 79, 80; Am. Ant. Soc., XIII. iii.; R. Island Soc., 81; Yale Coll., 81; Wisconsin H. S., 81.

A letter circular from the President of the Congrès International d' Archéologie Préhistorique à Copenhagen, 27 Aout, 1869, date March 1, 1869, was read.